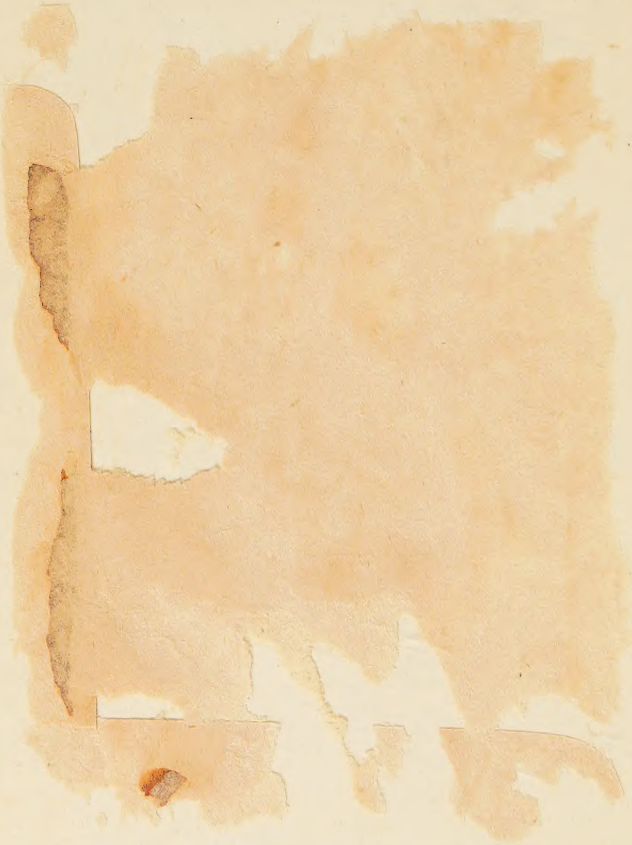
ORNAMENTAL TREES

for Amateurs

W. J. BEAN



THE BEAUTIFUL ST. LUCIE CHERRY, PRUNUS MAHALEB.

ORNAMENTAL TREES FOR AMATEURS

BY

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CONTENTS

LIST OF ILLUSTRATIONS

INTRODUCTION

This little book is intended to be a companion to "Shrubs for Amateurs" already published. Its aim, which is similar to that of its predecessor, is to present, in concise form, descriptive and cultural notes on the best and most interesting hardy trees in cultivation. Some four hundred and thirty different kinds of trees are mentioned, but it is not to be supposed that the majority of gardens can find room for more than a small proportion of them. Still, there is a deep and growing interest in trees, and very many amateurs are no longer satisfied with the ordinary villa garden type. They want something of more distinction and beauty. How rarely, for instance, in the smaller gardens of the outer suburbs of London can one find one of the numerous Japanese cherries—perfect trees as regards size and beauty for such places. Just as one longs to see the reign of such shrubs as laurels and privet come to an end in small gardens, so, amongst trees, is it time that poplars, sycamores and the like should cease to dominate and impoverish the same areas. In the planting of many such gardens the builder has had too large a finger in the pie. He builds the house, and, feeling he must stock the garden, goes to the nearest local nurseryman and buys whatever is going the cheapest. Sometimes a happy stroke is made, as in a suburban district I know, built over in pre-war times by one of the speculative type,

who evidently found a large batch of almond trees in some nursery and bought and planted them round his new villas. The result was that for many years the district gave a really charming display of exquisite blossom every March. But it is not often that things turn out so fortunately.

Besides enabling amateurs to select trees most suitable for their gardens, it seemed to me desirable also to provide them with a cheap and convenient means of ascertaining the character and quality of trees of which they might know nothing, but which they may see offered in catalogues, or whose names may come to their notice in other ways. This will explain why so many more species are described than it is likely one garden can accommodate, and why also many trees of interest, but perhaps inferior in ornamental qualities, are included.

In order to keep this volume within the same limits and at the same price as its predecessors, coniferous trees are omitted.

ORNAMENTAL TREES FOR AMATEURS

CHAPTER I

CULTIVATION

The cultivation of trees is in many respects identical with that of shrubs, so that much of what is written under this heading must, in essence, be a repetition of what has appeared in the companion volume. Especially does this apply to the quality and preparation of the soil. As for shrubs, so for trees in general, the best of all soils is a deep, open, well-drained loam. In nature, trees occur mostly in congregations; solitary specimens as a rule owe their isolation to man's interference or to some accidental circumstance. In gardens, on the other hand, we usually prefer our trees to have sufficient space for their full lateral development. We like "specimen" trees. Thus there arises one great difference between the conditions that surround a young tree growing on the spot where the seed from which it sprang fell from the parent tree and those of an ordinary garden or park. Nature's baby tree grows probably in semi-shade and in ground covered with many years' accumulation of humus, and it is sheltered from drying winds by its companions. A young tree set out on a garden lawn or in a park, if allotted space

sufficient for its ultimate development, has its upper growth fully exposed to the sun and wind, and the soil in which its roots are placed is exposed to the same drying influences. Hence it is incumbent on the planter to provide conditions that mitigate as much as possible the initial disadvantages of a newly planted tree.

This is most effectually done by a thorough preparation of the soil. If it is already of the nature described above as the most desirable, it should be trenched to a depth of at least 2 feet. Ordinary trenching, such as is often practised for high-class vegetable cultivation, where the bottom layer comes to the top and the top one goes to the bottom, is not suited for trees planted in what is practically virgin soil, or soil not previously stirred more than a spade's depth. On such ground, soil brought up from 1 to 2 feet below the surface is not good for newly planted trees. What is known as "bastard" trenching is to be preferred. By this system the top 12 inches of soil is kept at the top and the lower 12 inches is turned over and broken up, but left where it was. Ground prepared in this way maintains its moistness during spells of dry weather far better than unbroken ground, and trees freshly planted have a much better chance of getting through the first season successfully. In theory, of course, if an area approximating that which will ultimately be occupied by the roots of the tree can be trenched, that is all to the good. For memorial trees or trees that may become historical it is worth doing, but for ordinary occasions the labour and expense are too great.

Borders or plots of ground on which the smaller flowering trees like eucryphias, styraxes, laburnums, and cherries are to be associated with shrubs should

certainly be trenched from end to end. For specimen trees on lawns, a plot at least 8 feet in diameter should be prepared. That amount of space, at any rate, will give each of them a good start in life, and that is the important thing.

In places where the soil is so shallow, sandy, or gravelly that trees show signs of suffering after even a short spell of dry weather, an area at least as large as that just recommended should be prepared by deepening the soil and improving its quality. As trenching proceeds the poor subsoil of sand, gravel, chalk, or whatever it is may be thrown out and replaced with good loam, decayed leaves, potting-shed refuse, or any sweet humus available. If a space only 8 feet square is treated in this way it will provide good sustenance for the smaller trees, and it is remarkable how the larger ones like oaks, beeches, and hornbeams will, with such a start, eventually spread out their root system into the surrounding unbroken ground. In nature, of course, they would have to do this to exist at all, but in practice we often have to grow trees on soils and in places where they could never have gained a footing had a state of nature continued.

In dealing with the cultivation of shrubs in the companion work I have pointed out the desirability, or rather the necessity, of maintaining a space round the plants free from grass or weeds and keeping the surface soil loose. It is even more essential for the healthy progress of young trees. Many shrubs have branches near the ground, and they keep it shaded and more or less free from weeds, but a young tree with its bare trunk gets no help in this way.

CHAPTER II

TRANSPLANTING

Trees in gardens should be put in their permanent places as soon as it can be conveniently done. As a rule, the younger it is the sooner and better it grows and establishes itself. With the proper appliances trees of large size and great age are frequently transplanted successfully, but the process is often attended with risk and it is invariably costly. For the majority of amateurs' gardens the shifting of large trees is almost out of question; there is rarely the apparatus available, and the general upset is so great that it has to be avoided if possible. When, however, with trees very highly prized for their rarity or associations, it becomes a matter of choice between destruction or removal, and the latter alternative be chosen, it is better to secure the services of a professional tree shifter.

Many deciduous trees with stems up to 3 inches in diameter can be safely transplanted from one part of the garden to another if they are taken up carefully from the soil. With such trees it is necessary to preserve uninjured as many of the smaller roots as possible. To do this one must dig a trench at the outer circumference of the root system and gradually work away the soil from the roots with a fork back to the stem. If the process is a lengthy one—and it should not be

hurried—the roots as they are made bare should be covered with damp sacking or something of the kind. A hole sufficiently large for the roots to be spread out to their full extent should previously have been prepared on the new site for the tree.

Deciduous trees with stems up to 15 feet high may be obtained from good nurseries which are safe to plant provided the roots are not allowed to get dry on the journey. In first-class nurseries such trees have been transplanted every few years, and their root system is much more compact and closer to the stem than is the case with trees that have been left undisturbed. They are, consequently, much simpler and easier to remove. But it has to be said that although trees 15 feet or even more high are sometimes needed to give an immediate effect, they do not as a rule accommodate themselves to their new quarters and grow away so quickly as younger and smaller ones do. Trees one-half, or even one-third their size will often overtake them in a few years. Necessarily, also, they are more costly to purchase. On the whole, as has already been stated, it is best to start with small specimens, more especially with such trees as oaks, beeches, and hornbeams, which, transplanted with naked roots at a large size, are often sullen and slow to regain vigour. Horse-chestnuts, limes, poplars, and planes are some of the most satisfactory trees to plant when large.

With regard to evergreen trees, it is almost impossible to transplant them safely unless large "balls" of earth are carried with them. In establishments like Kew, where there are machines specially designed for transplanting trees with masses of earth weighing up to six tons or more, also labour skilled by long practice

available, it is a simple matter to move evergreens from one place to another. It is, nevertheless, a costly one and outside the consideration of most amateur gardeners.

With a few men available, however, it is often quite possible to move such trees a short distance in the garden—trees, for instance, growing so closely together as to be spoiling each other, or those whose removal a short distance may be desirable to open or close up a view. The most important matter in these cases is to keep the "ball" of earth intact. This is most easily done by shaping it into cylindrical form, wrapping it round with stout canvas or matting, and binding it up with at least two cords, one near the top and one near the bottom. Between the cords and the canvas thin boards have to be placed to prevent the former cutting into the "ball." Of course each cord must be made as tight as possible, and this is effected by making a loop at one end, threading the other end through it, and pulling hard. The "ball" has now to be undermined and lifting boards put beneath it. If the tree is to be moved a few yards only, it will be worth while to dig out a sufficiently wide trench, along which it can be dragged or rolled on planks to its destination, and thus save lifting it out of the hole. If the distance be too far for this to be done and no lifting apparatus is available the "ball" should be got out by rolling it up a gently inclined plane on planks.

From even this short description of the task, it will be evident that the transplanting of large evergreens is to be avoided if possible. Persons with a bent for mechanics may find pleasure in it, but with only rough-and-ready appliances it is difficult to keep the mass of

soil intact, and the process is always attended with risk. When the removal of such a tree is known to be inevitable, it is a good plan to prepare the "ball" a year or even two years beforehand. This is done by marking out the dimensions of the "ball" to be shifted, and then, by digging out a trench, shaping it just as if it were to be moved at once. In this way all large roots are severed. The trench is then refilled and the soil rammed in again very firmly. The object of all this is to induce the production of fibrous roots which can be preserved at the real removal. Before refilling the trench it is very necessary to undermine the "ball" and sever any roots descending vertically. For this reason one-half of the "ball" should be dug round and undermined and the trench refilled before the other half is started on.

One of the most frequent mistakes made in planting trees of any size is in burying the stem too deeply. If trees that have grown naturally from seed are examined, it will always be found that the place where the uppermost roots push from the stem is about the level of the ground, and this is what must be aimed at with planted ones. The normal buttressed base of a trunk is due chiefly to the thickening of its big main roots. The stems and bark of most trees are intended by nature to be in free air, and when buried even a few inches in the earth perpetual darkness and damp frequently cause a ring of buried bark to rot. In light sandy soil the danger is not so great, but in heavy clayey soil it must be strictly guarded against. Many apparently unaccountable deaths are due to neglect in this matter. Where holes have been prepared, say to a depth of 2 feet, the trees should be planted high enough to allow

for them settling ultimately to the level of the surrounding ground—usually about 3 inches.

Another important matter in planting is that the soil should be trodden or rammed very firmly about the roots. Especially is this the case with light sandy soil, but even heavy soil should be made genuinely firm. If possible, planting in a clayey soil should be avoided during very wet periods. With such soils it is a good plan to have at hand some lighter soil to place in actual contact with the roots before filling in with the ordinary staple. When the soil is open and loose, a heavy watering is a very useful means of closely compacting soil and roots.

Time for Transplanting

Deciduous trees with few exceptions may be planted at any time during open weather from autumn to spring. Frosty periods and periods when there is a dry parching wind, such as are frequent in March, should be avoided, especially if the plants have to remain some time out of the ground. On the whole, the best time is just as the leaves are falling, but that is not a very long period nor always a convenient one.

It has already been pointed out that transplanting evergreens with naked roots is attended with much more risk than it is with deciduous trees. The reason is that with them the transpiration of moisture is going on all the time, even in midwinter, and the leaf-bearing part of the plant is much more dependent on the root system than that of a deciduous tree at the same season. It becomes essential, therefore, that evergreens should

be transplanted at a time when the small feeding roots put out of action by the process can be most quickly renewed. Such a time is either in autumn before active growth ceases, or in late spring, after it has recommenced. The latter is shown by the movement of the buds towards the bursting stage.

I am a strong advocate of cutting away a considerable proportion of the leafy growth of any evergreen that is being transplanted. From an evergreen oak, for instance, or a holly I would prune off at least one-half of the leaf-bearing branches, both by cutting out some clean back to the stem and by shortening back those that remain. Even a deciduous tree is benefited by similar procedure, and the greater the root damage the more copious should be the pruning. Evergreens like hollies and yews transplanted with naked roots are helped considerably if they can be covered for a few weeks with tiffany or a canvas thin enough to let through some light. This gives them shade from the sun's rays and mitigates the effects of a drying wind—the two factors that militate against success more than any other with spring-planted evergreens—and thereby helps them over those critical days between transplanting and the emission of new roots.

Staking

Trees over 3 or 4 feet high that have been transplanted very frequently need some artificial support until they have firmly secured themselves again in the soil by making new roots. In quiet, sheltered corners it may not be necessary, but where the position is at all

exposed, newly planted trees are very liable to sway during winds, the base forming a kind of socket in the soil. Such trees take longer to become re-established, and the danger of entire failure is greater than when the stem is rendered immovable by some sufficiently strong support. The usual method of accomplishing this is by driving a stake into the ground close to the stem and tying the two together. The stake should always be rather stouter than the stem, and, unless the latter is unduly slender or crooked, it need not be more than half the height of the tree. The chief aim is to see that the base of the stem is firmly fixed; if the stake should serve the purpose of straightening out a crooked stem as well, so much the better. In driving the stake into the ground there is usually some danger of injuring one or more of the thicker roots. To avoid this it should be sharply and rather slenderly pointed, so that it may squeeze its way between the roots rather than crush through them. For trees of large size it is a good plan to fix the stakes in the ground before they are planted. The stem can then be set against the stake and tied to it and the roots arranged round its base. Whilst this plan avoids any danger of injury to the roots, care must be taken afterwards to see that the ties are not holding up the tree and preventing it settling down with the soil as it should do.

A useful temporary method of supporting newly planted trees of the larger size in exposed positions is to attach three pieces of cord at, say, two-thirds of its height and then tying each of the lower ends to a stout stake driven into the ground at equal distances round the tree well out from the stem. Wire is better than cord, which tightens up in damp weather, but is

A FINE HORSE CHESTNUT, ÆSCULUS HIPPOCASTANUM

THE BERRIES OF THE ATTRACTIVE STRAWBERRY TREE, ARBUTUS UNEDO

apt to become slack in dry. With any means of support it is always essential to put some protective material, such as old cloth or rubber piping, between the stem and the tying material, so as to prevent the latter cutting into the bark or the bark chafing against the stake.

CHAPTER III

PRUNING

THERE is one great difference between the pruning of trees and that of shrubs. The latter are frequently pruned with a view to increasing the quantity and bettering the quality of the blossom—such shrubs, for instance, as garden roses, the late flowering spiræas, and *Hydrangea paniculata*—but trees practically never. In pruning trees the aim is so to regulate the growth that shapely specimens may be developed showing each particular kind at its best, whether it be naturally large or small. In the smaller gardens, for whose owners the present work is mainly designed, there is naturally not room for many trees of the same type as our common oak, elm, beech, or ash. But in a garden of even an acre a few large trees make a very precious possession, giving shade in summer and imparting dignity to the garden at all seasons. If they are not already there, it becomes one's duty, as Mr. Charles Eley has so admirably shown in his "Gardening for the Twentieth Century," to plant them. Nor need such planting be regarded as always altruistic. The late Canon Ellacombe planted a common oak in his garden at Bitton which had made a trunk 3 feet in diameter before he died. He was a nonagenarian, but

middle-aged men may plant such trees with a reasonable expectation of living to enjoy their shade, to say nothing of the benefit they confer on those that follow them.

The first important matter in the pruning and training of young specimens of trees that naturally attain a large size is that they should be made to form one single, clean, straight trunk. Such trees should never be allowed to fork low down. If they are, the head of the tree ultimately becomes divided into two or more parts, each heavy with its own branches and foliage and very liable to split at the fork. When once such a split starts, it is the beginning of the end, for damp is sure to enter and decay to follow. It is, perhaps, a matter of taste, but to my mind a tree with a fine single bole is always the more impressive.

The chief requisite in a young tree, therefore, is that it should have one well-defined leading shoot, and that this should maintain its predominance over all rival shoots until the basis of a trunk of sufficient height has been obtained. On young, healthy trees, such a leader, when once it has developed, will usually keep its place if no accident occurs. But fierce winds sometimes snap them or squirrels bite them through, with the result that two or more shoots will come in place of the original. When this happens, the shoot best placed for making a new leader should be selected and the others shortened back to give it predominance. If it is possible to bring the selected shoot into an erect position at once by tying it to a temporary support, so much the better.

Trees as they grow in nature usually occur in forests or woods, or at least in groups, and their lower branches,

for want of light, automatically decay and disappear. In gardens and parks trees are mostly isolated, and retain their branches much longer and lower down the stem. In order to help the tree to increase more rapidly in height and prevent it wasting its energy in building up side branches that will be too low down the stem to remain permanently, the lower ones should be removed as the tree grows in height. This, however, requires some judgment. A premature or excessive removal of lower branches will induce the growth of long "whippy" leading shoots too slender to hold themselves erect, thereby involving the use of stakes or other artificial support. It is often better as a temporary measure to shorten back low side branches instead of cutting them entirely away. They will still help to build up and thicken the main stem, and can be removed when this is stout enough to stand unsupported. Good nurserymen often keep their young trees, as they grow in nursery rows, feathered almost to the ground with small side shoots pruned so as to make each tree a slender column of leafy growth, the object being to build up a stout, self-supporting stem. We must always remember that the more leaves a tree has the more woody tissue is formed; one has only to see that it is deposited in the right place.

Besides removing the lower branches it is often advisable to thin out branches from the head of the tree. Trees that have got into a stunted condition and are forming unduly bushy heads may frequently be induced to make longer, cleaner growths and increase in height by this means. If one compares the branching system of a young tree with a fully grown one of the same species, it is very evident that the great

majority of the original branches have been suppressed. It is only anticipating nature to cut away branches too crowded to develop properly, and thereby utilize the energies of the plant for those that remain.

The natural shape of an ordinary healthy tree is in the main that of a slender cone, and the cultivator's aim should be to produce this by shortening back side shoots if they become too assertive. This does not mean, of course, that a rigidly formal outline need be preserved.

Removal of Large Limbs

This operation is always attended with a certain amount of danger to the tree through the inevitably large wound taking a long time to heal over, and all the while affording a settling place for the spores of parasitic fungi, which germinate on the raw surface or in the cracks that form there and set up decay that eats into the trunk. Hollow trees almost invariably are caused in this way, the disease starting perhaps where a limb has been torn off by wind. It is, however, sometimes absolutely necessary to remove such limbs from old trees for reasons of safety or convenience.

In doing this it is necessary first of all to remove the limb in at least two, usually more, pieces, so that the last piece sawn off is not heavy enough to fall away of its own weight before the saw has got nearly through it. If a heavy piece of limb is left for the final amputation, it breaks away and often tears off part of the trunk with it, making a much larger wound than need have been.

All limbs and large branches should be sawn off

close to the trunk so that no stump remains. Neglect in this matter is the commonest and most fatal error in connection with the removal of large branches. When these are sawn off closely, the tree at once begins to cover the wound with new bark that gradually creeps in from the sides. It may, however, take years for this process to be completed, and during that period the danger from fungoid attack is always present. The best protection against this is to keep the wound carefully covered with tar, either ordinary gas tar or the Stockholm variety. Personally, I have always used the former, and find it answers admirably. As soon as the branch is removed it should be thoroughly painted over with one or two coats. After a few months, or perhaps during the following summer, the surface is liable to crack, and fresh surfaces for the lodgment of fungus spores are thereby provided. Then the tar-brush should be applied again. In fact, large wounds should be watched until the bark has grown completely over them. The base of the wound, being the most dangerous place and the slowest to form new bark, should especially be watched. I have already said that the removal of large limbs or branches is always attended with risk to the tree. This is largely because, as time goes on, the wound is forgotten. Some trees, moreover, are not important enough to keep a place in the owner's mind. But having pointed out the danger and the safest guard, I must leave it at that.

Time for Removal.—Branches of dry-wooded trees like oak, beech, hornbeam, or poplar can be removed at any season, although the best and most convenient time is when they are devoid of foliage. But for trees that "bleed" like birches, horse-chestnuts, and many of

the pine family, November should be the month selected. By removing branches then and immediately tarring the wounds, several months are allowed for the surface to harden before the spring rush of sap commences.

CHAPTER IV

PROPAGATION

THERE is no doubt that, with very few exceptions, trees raised from seed are healthier and longer-lived than grafted ones, or even those raised from layers or cuttings. It is, however, impossible to get some of the best flowering trees from seeds—firstly, because many of them are selected forms that do not reproduce themselves true; and, secondly, because many, such as some foreign trees and those with "double" flowers, do not ripen seed at all.

In the gardens of many amateurs lack of space is against the planting of a large number of trees, and it is only a few of a sort that are needed. It is scarcely worth while, therefore, to go to the trouble of raising trees for one's self, especially as several years can be saved by buying them from a nursery. Still, many people find pleasure in raising their own trees, and there is no reason at all why such as laburnums, sweet-chestnuts, horse-chestnuts, oaks, beeches, or indeed any that produce seeds, should not be raised from them. Some trees also, like willows and poplars, can be obtained easily from cuttings, and there is no reason either why one should not raise one's own stock of them if desired. The development of a tree whose existence is due directly to one's own skill and labour

is always more interesting to watch than that of a purchased one.

It is better to sow seeds under some sort of protection, such as in a cold frame or under a handlight. They can then be watched more easily, and are not so much at the mercy of weather and vermin. The soil in which most tree seeds germinate best is made up of three parts of light loam and one each of coarse sand and leaf soil. With a heavier loam more sand is needed. Although most seeds fall naturally from the tree in autumn, frequently they do not germinate until spring. In some instances, such as with the hawthorn and some of the prunuses, they lie dormant a year and a half from the time they are ripe. The davidia may be a year longer. Large fleshy seeds, like acorns and the chestnuts, must not be kept dry for long before sowing, otherwise they lose their vitality. If they cannot be sown when they fall, they should be buried in sand and kept in a cold place until they can be sown.

For amateurs who need only a few trees of a kind, it is a useful plan to sow one seed in a pot, so that when large enough the young tree can be planted where it has to go without disturbing the roots. Care must be taken not to leave the seedling in the pot so long that the roots have reached the sides of the pot and commenced to grow round it. If this has happened the outer roots should be eased away from the ball of soil before planting, otherwise they remain in a sort of coil, and, as they thicken, interfere with each other's development.

As regards the depth at which seeds should be sown, the mistake is frequently made of burying them too deeply. In nature, of course, they drop to the ground,

and the only covering they get is made by leaves falling on or being blown over them. A good general rule is to cover them about their own depth with soil, although they will bear burying more deeply in the freedom of the open air than under cover.

Cuttings

For some reason trees on the whole are not so easily raised from cuttings as shrubs. Such common ones as oaks, beeches, limes, and birches do not take root readily, although it is far from impossible to make them do so. Many of them produce seeds so freely that nothing else is needed. Variegated, weeping, fastigiate, and other abnormal forms are usually grafted on their respective types. Mulberries, willows, and poplars are very easily increased by cuttings made of shoots one to three or even more years old, put in the open ground after the leaves have fallen. They may be made from 1 to 2 feet long—the longer the stouter—with all the side twigs trimmed off. One-third of their length should be buried in the ground. It is desirable to make the base of the cutting just below a joint in the shoot. Although these are the easiest trees to get to take root, success with other trees like prunuses (cherries, plums, etc.), the apple and pear tribe, and even birches may be achieved. In fact, it is probable that many more trees can be raised from cuttings than is generally supposed. If a propagating pit or frame is available and a little bottom heat provided, cuttings of many trees will take root much more readily. In this case, cuttings are made in late July or August

of leafy shoots of the current season when the wood is getting firm and ripe. Short side twigs are much better for the purpose than strong, vigorous leading ones. Such cuttings should be put in pots, and the soil, as for all cuttings, should be very sandy. With regard to cuttings put in the open ground in late autumn, it is usually necessary after a frosty spell to press the soil firmly about them again.

Layering

There is no more certain method of propagation than by layering, but it is naturally better adapted for shrubs than for trees, which are usually devoid of branches low enough to be brought to ground level. When branch and earth can be made to meet, there are very few trees indeed that will not emit roots, although naturally some take a longer time than others. Quite thick branches of beeches and horse-chestnuts, whose length and weight have brought them to the ground, may occasionally be seen to have taken root without artificial help and formed a colony of young trees round the parent one. The process of layering consists in bending a shoot or branch to the ground, fixing it securely there by a peg or piece of stone, or preferably both, 1 to 2 feet from the end. After the shoot is pegged firmly down it should be covered with 2 or 3 inches of soil and then a flat piece of stone put over it, chiefly because that is the simplest means of keeping it moist, but also because it helps to keep the layered part of the branch firmly fixed, the two most important points in layering. With branches of ordinary suppleness it is usual before fixing

the layer in its place to make a notch or shallow slit in the wood at the portion that will be buried. This is done to check the flow of sap and induce the formation of a callus and the more speedy emission of roots. It is generally desirable to raise the terminal part of the layered branch by attaching it to a firm stake thrust into the earth in a slanting direction so that it is at least clear of the ground. When the branches are brittle, the plan of twisting a piece of wire tightly round the buried part may be adopted instead of notching or slitting it. The best time for layering is in spring, just before growth commences, but rather than lose time it may be done in summer or autumn. The most unsuitable time is when the plant is in early growth and the shoots soft and succulent.

CHAPTER V

CARE OF OLD TREES

PERHAPS there is no matter on which expert advice is more often sought than that of arresting the decay of aged trees. In nearly every garden or park there are some such trees whose beauty, rarity, interest, or perhaps associations endow them with a peculiar value in their owner's eyes. It is natural that signs of decay or failing health in such trees should be noticed with concern. Yet there is no doubt that the life of many such trees is shortened by neglecting certain simple preventive or remedial measures.

The most potent agencies that affect the decline of trees are three—viz., failing food supply (with which may be associated seasons of severe drought), parasitic fungi, and storms. Trees growing on closely mown lawns whose branches do not come low enough to shade the root area are more likely than any to suffer from lack of moisture, especially when the lawns are old and well trodden. The turf forms a close fibrous mat which rain permeates slowly, especially after a dry period, and the grass itself gets the first pull at whatever rain falls. Unless the rain is persistent or heavy, the tree roots may receive scarcely any. Trees in parks either grazed or mown for hay do not feel drought quite so much, because the grass is not so tight and close and water penetrates more easily.

The first indication of failing vigour is usually a shorter annual growth and sparser foliage; after that dead branches begin to appear, especially at the top of the tree. With the advent of either of these signs, it is time to adopt remedial measures. If it were possible to supply the most perfect soil conditions to a tree, one would keep the entire area of soil occupied by its roots open and loose on the top and free from grass, weeds, and other vegetation—conditions, in fact, analogous to those one sees in thickly wooded land, where the overhead canopy is close enough to subdue most other plant growth and the loose surface ground is covered with generations of decayed leaves. In such places trees rarely suffer from drought. But in gardens bare loose earth beneath large trees will rarely be tolerated, and some sort of compromise has to be adopted.

A tree growing on a lawn or on grassland that is showing signs of decline may, towards the end of October, have the turf removed as far out from the trunk as the bulk of the roots are likely to extend. The surface should be forked over as deeply as can be done without injuring the roots, then given a layer 4 to 6 inches thick of manure and decayed leaves in the proportion of, say, two of the former to one of the latter. The longer the soil can remain in this open, loose condition the better for the tree, but even if considered unsightly it may be left in this state through the winter and sown down to grass again in the spring. Even this operation—half-hearted as one may regard it—will do the tree good, especially where the surface had previously become hard and the turf closely matted. Trees whose branches reach the ground, treated in the same way, may usually be left. Grass rarely grows

with vigour there, and the lower leaves in summer hide the ground beneath the trees. But even under such trees the surface of the earth often becomes hard and caked, and the forking over and mulching does great good.

There is no doubt that droughty summers like that of 1921 hasten the end of many old trees in declining health. Water applied by artificial means will enable a tree to tide over a difficult time, but it is rarely available in sufficient quantity, for unless given freely enough to moisten the ground thoroughly no great benefit ensues. The mulching system is always practicable and always advantageous.

Parasitic Fungi

Whilst the decline of trees, as discussed in the previous paragraphs, may be regarded as a more or less natural symptom analogous to old age in animals, the attacks of fungus parasites can, in the same way, be compared with the diseases of an infectious or contagious nature to which animals are subject. In some cases there is no remedy. None, for instance, has been found for the silver-leaf disease, whose outward manifestation is a curious greyness of the foliage; but apart from the genus *Prunus* and other related genera it is not very common amongst ornamental trees. The most subtle and deadly of all tree diseases are those caused by fungi on the roots. In most cases the evil has got past cure before it is known to exist. Fungus spores enter the tissues of the roots just as they do the upper growth by means of wounds, and whenever, during

digging or ground operations, roots of even moderate size are severed or the bark skinned off, the new surface should be painted over with tar before the soil is filled in again. But root infection, fortunately, is by no means so common as that of the branches and trunk, where the attack can be detected and dealt with. I have not known oak, hornbeam, or elm attacked by root fungus, but horse-chestnut, birch, tulip tree, hawthorn, beech, and some of the pines are subject to it.

A rather common disease of the branches, known as the "coral-spot" fungus, is often seen in autumn, on dead or partially dead branches, in the form of numerous small, orange-coloured pustules. Branches so attacked should be sawn off and the wounds coated with tar. For trees partially affected with silver-leaf fungus the same procedure is the only one that can be recommended.

The commonest evidence of fungus attack is seen in the cavities that come on the main branches and trunk. These all originate from either a wound in the bark, a branch broken off by wind, or from an amputation. I have already pointed out in the remarks on pruning how necessary it is, when a branch or limb has to be removed, that it should be pruned off quite close to the trunk so that no snag is left. If that is done and the wound kept covered with tar as advised, new bark commences to close over and will in time cover it. But if a snag or jagged end is left several inches long, the new bark cannot climb over it, and it remains a permanent source of danger, fungus attacks it, and in time it decays back to the trunk, where ultimately a cavity forms which may, and very often does, eventually extend right down the trunk. The hollow trunks of old trees always have their beginning in this way. The

CERCIS SILIQUASTRUM.

THE HANDSOME BERRIES OF CRATÆGUS CRUS-GALLI.

two preventive measures therefore are, first, to saw off the branch so that no stump or snag is left, and, secondly, to keep the wound airtight and watertight by maintaining its coat of tar as long as may be necessary.

Treatment of Cavities

The question of how to treat cavities that have already formed remains to be dealt with. No tree has the power to fill up hollow places in its trunk or limbs. If it is very small, the new bark growing at the lips of the wound may ultimately meet and close up the opening, but usually this cannot happen. In fact, the opposite process almost invariably is going on, and the cavity is continually enlarging both sideways and in depth by the progressive decay of the wood. Often the cavity occurs where water drains into it, and it acts as a catch-pit. There is no doubt that such cavities, besides being unsightly, are a source of danger to old trees; they undermine their stability and hasten their end, and should be filled up.

The process is essentially the same as that of a dentist stopping a hollow tooth. The first thing to do is to clear out all decayed matter, often sodden and foul, from the cavity back to the sound wood. When it has served as a catch-pit for rain and is too deep to be emptied otherwise, it is best, by means of a piece of stiff wire, to find how deep it is, and then, with an auger, bore a hole from the outside to the bottom thus located. If the auger hole is bored to slant upwards slightly, the water and sludge can be cleared out more easily. After this is done the walls of the

cavity must be left to get dry or nearly so. The next thing to do is to treat it antiseptically, which can be done by dressing the walls thoroughly with gas tar, Stockholm tar, or creosote, any one of which will kill any fungus with which it comes in contact.

It now remains to fill up the cavity and make it watertight. Asphalt has been strongly recommended, and I have no doubt it is excellent, possibly the best stopping one can use. But ordinary Portland cement serves very well, especially for any but the largest cavities, and, being easily obtainable and easily mixed for use, is very convenient.

A mistake frequently made is that of filling up the cavity too full. When it has originated from a wound at the side of a limb or trunk, there will almost invariably be found a roll of new bark round its edges. The tree has attempted to close over the opening, but has failed because the new bark has lacked a surface to grow over and set itself upon, such as it would have been provided with had the limb been sawn off close to the trunk and protection from decay given by tarring, as has been advised. The stopping must be made to serve this purpose, and to do this effectually it should not be allowed to come above the lower edge of the roll of new bark. If the cavity be filled to the very top, it may not be possible for the bark to climb over the stopping. When the hollow is a large one with its opening where the trunk has forked into two or more limbs—a very usual place for it—the only thing one can do is to fill it so full that water can find no lodgment there. In such places it is hopeless to expect new bark to grow.

Damage by Storm

Just as the two agencies previously dealt with may be compared respectively with old age and organic disease in the animal world, so can partial or complete destruction by wind be compared to accident. It is the most common fate of trees, more especially isolated ones. Those that escape it longest are low, sturdy ones, such as are typified by our own longest lived trees—the oak and yew. All long lived tall trees, such as the giant sequoias of California or the various pines and firs, have a single trunk. Trees growing in close formation in forests, of course, shelter each other, but they have as a rule a much less secure anchor hold of the earth than those that grow singly. In a storm they often come down like ninepins if previously exposed by the removal of the outer trees. The tree most liable to fall a victim to fierce gales is the one that has a tall head supported by two or three separate limbs that have originated low down. These are very liable to set up a crack at the fork and ultimately break away in high wind, which is one very good reason why isolated young trees in gardens and parks should be kept to a single leading shoot as long as that can conveniently be done.

With existing large trees the matter is very much out of one's hands, but two things can be done: the head of branches, if dangerously heavy, can be reduced to lessen the strain put on them by storms, or the limbs may, by bracing them together, be made to afford each other mutual support.

Whether or not the first of these is necessary is a matter for judgment to be exercised in each case, and

its carrying out needs taste and care. Trees that have long been sheltered from prevailing winds and have suddenly become exposed by the removal of other trees can be rendered safer from mutilation or complete destruction by reducing unduly long or heavy branches. The upper, erect-growing branches of a tree can be lopped back with greater assurance and less regard for the temporary disfigurement than the side ones, because they break more freely and strongly into growth again. Side branches that have become dangerously heavy should either be cut right out, or back to a place where there is leafy growth remaining to refurnish that part of the tree. Elms, as is well known, may have their limbs lopped off to within a few feet of the main trunk and break again freely into growth, in time making shapely trees again. So subject is the common elm in old age to drop large branches without warning that in thoroughfares and much frequented places this lopping is very necessary.

Many trees that have forked early in life into several limbs can be strengthened greatly by bracing the limbs together. This is usually done by fitting a collar of iron round each limb and connecting the two by means of a chain or stout iron rod fitted with a screw arrangement for tightening up. No attempt should be made to draw the limbs closer together; the chain or rod should only be tightened enough to prevent them moving farther apart. An alternative method is to bore a hole with an auger right through each limb sufficiently large to admit of an iron rod $\frac{3}{4}$ to $1\frac{1}{2}$ inches thick, threaded at each end and long enough, not only to reach from limb to limb, but to allow the threaded ends to protrude 2 inches or so outside each. Two

stout plates of iron, curved to fit the surface of each limb, are then placed one at each end of the rod, and the whole tightened up by means of a pair of screw nuts. Care must be taken that the auger holes are only just large enough for the iron rod to be pushed through them, and they should, of course, be on the same alignment. Still, any slight deviation can be amended by bending the rod. The rod should be smeared with gas tar to make the auger holes watertight.

The rod and plate system is perhaps unsuitable for very resinous trees and others liable to bleed, but it has the advantage of being practically permanent, whereas the use of an iron collar involves a periodical adjustment to prevent it becoming imbedded in the wood as the limb increases in girth. It should be made with a hinge to enable the readjustment to be more easily done.

Whichever plan is adopted, the mistake of putting the support too low down the limbs has to be avoided. It should always be remembered that the natural resistance healthy trees can offer to storms is very considerable, and a little artificial assistance goes a long way. The higher, in reason, the support can be put and the farther it is away from the fork or point of weakness, the more efficacious it is likely to be.

CHAPTER VI

SELECT LISTS OF TREES

Trees for Shelter or for Forming a Screen

In many districts where new houses are being erected, one of the things most frequently desired, if it does not already exist, is a belt of vegetation to serve one or other, perhaps all, of the following purposes: As a screen giving a measure of privacy; to afford protection from strong winds; to shut out from view unsightly objects. This happens most frequently in suburban districts, but is often needed in quite rural spots also. Very often the occupants of such houses are people retired from business, or who have reached advanced middle age, and they naturally want the thing done quickly.

The most effective of all such screens or shelter belts are those consisting of evergreens, which serve their purpose in winter equally as well as in summer. Unfortunately, evergreens, apart from conifers, as a rule grow more slowly than deciduous trees, and they cannot be transplanted at so large a size. Conifers supply the best trees for the purpose, and nothing is better than Corsican pine, *Pinus excelsa*, Lawson cypress, *Thuya plicata*, and *Thuya nootkatensis* in districts with an average climate. To these, as being of especial value

where the soil is poor, may be added the Scotch pine. In milder districts *Cupressus macrocarpa* and *Pinus radiata* (*insignis*) are admirable.

The pines, especially if planted thickly, have the defect of losing their lower branches, but if planted at the back they will soon make a tall screen; whilst such evergreens as Lawson's cypress, the thuyas, hollies, and arbutuses can be planted in front to keep the space near ground level permanently blocked.

Where space is so limited that there is only room for a thin belt, there is nothing so useful as Lombardy poplar planted in two rows about eight feet apart each way, those of the front row alternating with those of the back one. This tree in good soil will increase in height 4 to 6 feet annually, and although deciduous, the branches grow so closely together that even in winter the screen they form is dense enough to serve its purpose very well.

Where time is not so much a consideration there is nothing that is quite so good as the holm oak; but it has to be planted small, and one must not expect anything very effective in less than twenty years. Common holly grows much more quickly in height, but for a long time maintains a rather slender pyramidal form, and therefore does not block out an objectionable view at the top so well as the round-topped holm oak would do. But where an evergreen screen, say 20 feet high, will do what is needed, I would certainly plant holly in preference to the oak, especially as it keeps itself furnished to ground level. The arbutuses make admirable blocks, and will add much to the interest and beauty of a belt of evergreens.

Where there is no restriction as to space and a screen

of vegetation is wanted quickly at a considerable distance from the house or view point, the black poplars are unequalled amongst deciduous trees. The black Italian poplar is much used for this purpose, and, indeed, no other tree surpasses it in rate of growth, whilst it transplants easily and can be cheaply purchased. Eventually it gets gaunt and ugly, and is apt in the end to become a nuisance costly to get rid of. I would prefer to plant *Populus Eugenei* (a quick grower of more columnar shape than the black Italian) or *Populus nigra betulifolia*, not quite so rapid in growth, but with a denser, more pleasing habit.

Other trees might be mentioned of a rather better class than the poplars, such as common lime and Norway maple, which are fairly quick growers; but those already mentioned will serve the purpose under discussion probably better than any, and readers should be able to select from them the ones best suited for their particular sites.

Trees that Flower after June

The great flowering season of trees in general is from March—when the catkin bearers like alder and a few of the almond and cherry tribe burst into blossom—until June. With the advent of July the beauty of trees in general has to be found in their foliage and mode of growth. Still, there is a small proportion whose flowering time has yet to come, and the following list of a few of the more ornamental species may be useful:—

Aralia chinensis.
Arbutus hybrida.
,, Unedo.
Catalpa bignonioides.
,, speciosa.
Cladrastis sinensis.
Clerodendron Fargesii.
,, trichotomum.
Cornus controversa.
,, macrophylla.
Ehretia acuminata.
Eucryphia cordata.
,, pinnatifolia.
Hoheria populnea.
Koelreuteria paniculata.
Maackia amurensis.
Magnolia grandiflora.
Oxydendrum arboreum.
Sophora japonica.
Tilia petiolaris.

The late flowering form of *Prunus subhirtella*, known as *autumnalis*, may be expected to flower between October and January, and *Ligustrum lucidum*, usually regarded as a shrub, but capable by training of being made into a small tree, flowers in September. The tulip tree, *Liriodendron Tulipifera*, flowers chiefly in June, but occasionally extends into July.

Weeping Trees

Trees with pendulous branches, or, as they are commonly termed, "weeping trees," have always been favourites in gardens, and they do indeed often make charming features on a lawn as well as serving to form pleasing natural arbours. A few, like *Salix babylonica*, *S. Salamonii*, and *Tilia petiolaris*, are naturally pendulous, but the majority have originated as seedling "sports" or freaks. Most of them are really prostrate, and, to form the ordinary weeping tree, have to be grafted on tall stocks or trained up to make a stem of their own.

Where there is abundant space no more striking tree

of its kind than the weeping beech can be found, but owing to its liability to become infested in summer with a white aphis it is unsuitable for sitting under. To afford shady sitting-places, the weeping ash and weeping wych elm are better, being quite clean trees. *Salix vitellina pendula* is a very beautiful tree, as weeping as the Babylonian willow, but with the added attraction in winter of its bright yellow young branches. These willows are especially suitable, of course, for the banks of a pool or stream.

Of weeping trees with beauty of blossom the following are not to be surpassed: Weeping hawthorn, *Prunus subhirtella pendula*, *P. Mahaleb pendula*, *P. Avium pendula*, *Pyrus salicifolia pendula*, and weeping aspen.

Weeping evergreens, apart from conifers, are scarce, the handsomest being the weeping hollies, both green and silver variegated.

Twelve good Flowering Trees for a Small Garden

Cercis Siliquastrum.
Cornus Nuttallii.
Cratægus Oxyacantha ("double scarlet").
Eucryphia pinnatifolia.
Laburnum alpinum.
Magnolia conspicua.
Prunus cerasifera Blireana.
,, Persica ("double pink").
,, serrulata Hisakura.
,, subhirtella.
Pyrus Schiedeckeri.
Robinia Kelseyi.

Twelve good Evergreen Trees for a Small Garden

Arbutus hybrida.
,, Menziesii.
,, Unedo.
Castanopsis chrysophylla.
Eucalyptus Gunnii.
Ilex Aquifolium camelliæfolia.
Ilex Aquifolium Wilsonii.
Laurus nobilis.
Magnolia grandiflora.
Nothofagus betuloides.
Quercus coccifera.
Umbellularia californica.

A Selection of Trees with Handsome Fruits

Acer Henryi (red).
,, Pseudoplatanus erythrocarpum (red).
Ailanthus glandulosa (red).
Arbutus Unedo (orange).
Clerodendron Fargesii, ,, trichotomum (blue). See "Shrubs for Amateurs."
Cotoneaster frigida (red).
Cratægus Carrierei, cordata, Crus-galli, prunifolia (all red).
Fraxinus Mariesii (bronzy red).
Hippophaë rhamnoides (orange).
Pyrus Aria, alnifolia, americana, Aucuparia, baccata, cratægifolia, John Downie (all red), P. Eleyi (purple).
,, Aucuparia fructu-luteo, prunifolia (both yellow).
,, Vilmorinii (rosy or white).

Good Trees for Autumn Colouring

Large.

Acer platanoides Rietenbachii (purplish-red).
Carya alba (yellow).
,, tomentosa (yellow).

Cladrastis tinctoria (yellow).
Gleditschia triacanthos (yellow).
Liquidambar styraciflua (red).
Liriodendron Tulipifera (yellow).
Quercus coccinea splendens (red).

Small.

Acer circinatum (orange and red).
,, griseum (red).
,, Henryi (red).
Amelanchier canadensis (red).
Cercidiphyllum japonicum (rich red or yellow).
Cratægus prunifolia (red).
Oxydendron arboreum (red).
Nyssa sylvatica (red and yellow).
Parrotia persica (red and crimson).
Pyrus cratægifolia (red).

Some of the best Trees with Coloured or Variegated Foliage

Acer campestre postelense (all yellow).
,, Negundo aureum (do.).
,, ,, variegatum (white).
,, Pseudoplatanus brilliantissimum (pink, marbled with white in spring).
Betula verrucosa purpurea (all purple).
Catalpa bignonioides aurea (all yellow).
Castanea sativa aureo-marginata (yellow).
Cornus controversa variegata (white).
Fagus sylvatica purpurea (all purple).
Liriodendron Tulipifera aureo-variegata (yellow).
Magnolia acuminata aureo-variegata (do.).
Prunus cerasifera Pissardii (all purple).
Pyrus aldenhamensis and P. Eleyi (all purple).
,, salicifolia (all silvery).

Quercus Cerris variegata (white).
,, rubra aurea (all yellow, turning green later).
Robinia Pseudacacia aurea (all yellow, turning green later).
Salix alba argentea (all silvery).
Ulmus campestris Louis Van Houtte (all yellow).
,, ,, variegata (white).

CHAPTER VII

A DESCRIPTIVE LIST OF TREES

Acer (Maple).

The maples are mostly deciduous trees easily distinguished from all other hardy ones by the character of the fruit, which consists of two small nuts attached to each other on one side and developing on the other a flat, membranous extension commonly termed a wing. Another good distinguishing character is the arrangement of the leaves opposite each other on the shoot—that is, in pairs. A typical maple leaf is broad and flat, and it has three to seven—usually five—lobes. There is, however, a group with leaves made up of three leaflets, and one species (*A. Negundo*) has usually five leaflets.

Provided they have a good loamy soil, the maples give no trouble to grow, for most of them are very hardy. On poor, dry soils some of them are liable to suffer during hot, rainless periods, and thereby fail to develop that rich autumnal colouring which is their chief recommendation for gardens. They should always be raised from seeds, grafting being only resorted to for the coloured leaved and other varieties that would not come true. For some reason, probably climatic, the seeds of many foreign maples grown in this country are infertile, the nuts, although perfectly formed, being hollow.

A. campestre (Field Maple).—This is the only maple truly native of Britain, and is usually a small or medium-sized tree 30 to 40 feet high, but occasionally twice as tall. Of neat, rounded form, it is quite a pleasant tree, but without any particular distinction or autumnal beauty, and is on the whole best fitted for the park and woodland. The leaves are 2½ to 3 inches

wide, five-lobed, and the leafstalk exudes a milky sap when broken. It is sometimes used for hedges, especially on the Continent, and is better suited for inferior soils than most maples. Var. *postelense* is one of the best yellow-leaved trees.

A. carpinifolium (Hornbeam Maple).—A small tree chiefly remarkable for the close resemblance its leaves bear to those of the hornbeam, especially in the large number of prominent parallel ribs. Of no special merit in autumn. Japan.

A. circinatum (Vine Maple).—A low, bushy tree with leaves 3 to 5 inches wide, round in the main, but seven to nine-lobed. It is one of the few maples with handsome blossom, the sepals being red-purple, the petals white, and its leaves die off in rich red and orange tints. Useful for small gardens. Western N. America.

A. cissifolium.—One of the maples with three leaflets to the leaf; a small tree. Leaflets slenderly stalked, 2 to $3\frac{1}{2}$ inches long, oval or nearly so, coarsely toothed, taking on red and yellow shades in September. The flowers and fruits come on slender racemes. Japan.

A. creticum (Cretan Maple).—A small tree, often merely a bush, with leaves smaller than those of any other maple; they are mainly 1 to 2 inches long, hard in texture, and often without lobes or teeth. It has no autumnal beauty. Crete and other parts of the Mediterranean region.

A. dasycarpum (Silver Maple) (syn. *A. eriocarpum*).—A fine tree, often over 100 feet high, of very graceful form owing to the pendulous outer branches. The five-lobed leaves are 5 or 6 inches long, coarsely toothed, blue-white beneath, long-stalked; they turn yellow or red in autumn. A valuable tree for parks and large gardens. Eastern N. America. Var. *laciniatum* and var. *Wieri* have the leaves more deeply lobed.

A. griseum (Peeling Maple).—A small or medium-sized tree remarkable among maples for its thin wiry twigs and its orange-brown bark, which peels off in flakes. The leaves have three leaflets, each $1\frac{1}{2}$ to 3 inches long, coarsely toothed, very glaucous beneath. Besides being one of the most distinct of maples, this is one of the most beautiful in autumn, the leaves fading to rich red and orange shades. Still very rare. Central China.

A. Henryi (Henry's Maple).—Another trifoliolate maple, the oval leaflets being 3 or 4 inches long, often without lobes or teeth. Flowers and fruits produced in slender pendulous racemes 6 to 9 inches long, the latter red when young. The leaves change to a soft glowing red in September and October. A charming small tree. Central China.

A. japonicum.—See "Shrubs for Amateurs."

A. lœtum (Colchican Maple) (syn. *A. colchicum*).—Two varieties of this Caucasian maple are attractive trees of medium size: var. *aureum*, with yellow young leaves, and var. *rubrum*, with reddish-purple leaves and young shoots. Both are small trees in this country, the leaves being five-lobed, each lobe ending in a long slender point, but without teeth. Leafstalks milky. They are often grown and sold under the wrong specific name of "pictum." The true *A. pictum* is a rare Japanese tree.

A. macrophyllum (Oregon Maple).—A large timber tree remarkable for the size of its five-lobed leaves, which are often 9 to 12 inches wide. The yellowish fragrant flowers are in pendent racemes up to 6 inches long. The fruits are borne in very large clusters and are notable for their hairiness and the large size of the wings. It is said to put on bright orange colours during autumn in its native country, but I have not noticed this to occur here. Still, it is a fine tree. Western N. America.

A. monspessulanum (Montpelier Maple).—A tree related and very similar in size and general appearance to our native "field maple," *A. campestre*, having the same neat, rounded habit of growth, but easily distinguished by having only three lobes to the leaf and in the leafstalks not being milky. S. Europe.

A. Negundo (Ash-leaved Maple or Box Elder).—The typical green-leaved form of this tree is not very well known, although it is handsome, of medium size, and wide, rounded form. The leaves are made up of three or five leaflets—the only maple so distinguished. In gardens the species is very commonly represented by the var. *variegatum*, whose leaflets have a conspicuous border of white or are wholly white. It first appeared in France

DAVIDIA INVOLUCRATA, WITH ITS WHITE BRACTS.

EUCRYPHIA PINNATIFOLIA, ONE OF THE BEST OF SUMMER FLOWERING TREES.

in 1845, but I have never seen other than small trees. Although not long-lived, it is one of the most striking of variegated trees. Var. *aureum* has leaves wholly yellow, and is a good grower, valuable for keeping in fine colour all the summer. *A. Negundo* is a native of N. America, and is represented on the western side of the continent by var. *californicum*, distinguished from the eastern form by its downy shoots, leaves, and fruits.

A. niköense (Nikko Maple).—One of the trifoliolate species, the three leaflets being but little or not at all toothed, somewhat oval in shape, the middle one 3 to 5 inches long, the two side ones 1½ to 2 inches. A tree rarely more than 30 feet high in this country, the foliage turning a lovely soft red in autumn. Japan.

A. Opalus (Italian Maple) (syn. *A. opulifolium*).—This tree is chiefly valuable for its early and profuse flowering, the crowded clusters of yellow blossom opening in March. Each flower is pendent on a slender stalk. Leaves 3 or 4 inches wide, roundish, and shallowly five-lobed. A tree 30 to 40 feet high of rounded shape. S. Europe.

A. palmatum.—See "Shrubs for Amateurs."

A. pennsylvanicum (Snake-bark Maple).—A small tree chiefly remarkable for the conspicuous white lines or stripes that appear on the bark after the branches are two or three years old. Leaves 4 to 7 inches long, and nearly as wide. In var. *erythrocladum* the young shoots turn bright red the first winter. Eastern N. America.

A. platanoides (Norway Maple).—A handsome quick-growing tree of large size, often 60 to 80 feet high. Leaves 4 to 7 inches wide, five-lobed, glossy green on both surfaces, stalks milky. Flowers greenish-yellow, opening in April on the leafless branches, and making a pleasing display. Europe.

Many varieties are in cultivation, the best of which are: *Schwedleri*, leaves rich red when young; *Reitenbachii*, turning purplish-red in autumn (ordinary Norway maple usually turns yellow); *globosum*, forming a low globose head of branches, and useful for formal arrangements; *Walderseci*, leaves very thickly covered with white dots.

A. Pseudoplatanus (Sycamore) ("Plane" in Scotland).—A

very large European tree naturalized in England, occasionally over 100 feet high, the trunk on aged trees covered with grey, scaling bark. The five-lobed leaves are 4 to 6 inches wide. Flowers in drooping racemes, yellowish-green. This is a tree for the park and woodland, not for ordinary gardens, especially small ones. It is a hungry, quick-growing tree with no autumnal beauty; the fruits sometimes turn red, and one variety —*erythrocarpum*—is especially notable in this respect, and is usually very ornamental in late summer on that account. Var. *purpureum* has the leaves rich purple beneath, but the best variety for gardens is one called *brilliantissimum*, whose young leaves are of a beautiful pinkish hue. A good town tree.

A. rubrum (Red Maple).—A large tree 60 to 80 feet or even more high, with greyish bark; leaves three or five-lobed, 3 to 5 inches long, bluish beneath; flowers and fruit red. Sometimes the foliage turns a good red in autumn, but it is not reliable. N. America.

A. saccharum (Sugar Maple).—One of the finest trees of the New England States, whose sap yields maple sugar, this has not been a success in this country. It is very similar to the Norway maple in leaf, but the leafstalks are not milky.

Æsculus (Horse-Chestnuts and Buckeyes).

Deciduous trees and shrubs, of which the common horse-chestnut is the typical representative in foliage and mode of flowering. The leaves are made up of usually five or seven toothed leaflets radiating from the end of the stalk, and the flowers are borne in large numbers on erect panicles at the end of the young shoots in late spring or summer. There are two sections of the genus—viz., the true horse-chestnuts, which have prickly fruits and five petals to each flower, and the "buckeyes" (once kept in a separate genus as "Pavia") that have smooth fruits and only four petals to each flower. The rich red-brown seeds of the common horse-chestnuts are characteristic of the whole of the species, but they vary in size. These trees enjoy a rich loamy soil, and should be increased by means

of their nuts, which must be sown as soon as they fall, or kept cool and moist until they are sown. Both in foliage and in flower these are some of our handsomest trees.

Æ. californica (Californian Buckeye).—A low, wide-topped, round-readed tree, 20 to 30 feet high, with usually narrowly oblong leaflets 2 to 4 inches long, greyish-green. Flowers closely packed in panicles 6 inches or so high, fragrant, white tinged with pink, the stamens standing well beyond the petals. Fruit top-shaped. A pleasing and distinct small tree that flowers in June and July.

Æ. carnea (Red Horse-Chestnut) (syn. *Æ. rubicunda*).—A very handsome tree of the middle size, of rounded shapely form, rarely more than 40 feet high. Leaves like those of the common horse-chestnut, but darker green and smaller. Flowers deep red on a panicle 6 to 8 inches high and half as much wide. Fruit slightly prickly. For small gardens this is much to be preferred before the common species. Its origin is not certainly known, but it is conjectured to be a hybrid between Æ. Pavia and common horse-chestnut. It comes true, or nearly so, from seed. The best and most richly coloured variety is one called *Briotii*. Late May and early June.

Æ. glabra (Ohio Buckeye).—A middle-sized tree with the usual type of leaf, but much smaller than that of *Æ. Hippocastanum*. Flowers greenish-yellow, in panicles 4 to 7 inches high, opening in May and June. Bark of the trunk fissured. A nice-looking tree, but one of the least attractive in flower. N. America.

Æ. Hippocastanum (Common Horse-Chestnut).—This well-known species must be regarded as one of the very finest of all hardy trees of the largest size, combining as no other does noble proportions with great beauty of flower and foliage. Native of N. Greece and Albania. One of the best of all trees for avenues, magnificent examples of which are at Castle Howard and Bushey Park, the latter planted by Sir Christopher Wren in 1699. It reached England by way of Constantinople, Vienna, and France early in the seventeenth century. There is a "double" flowered variety (*flore pleno*), whose blossom lasts longer and does not produce fruits.

Æ. indica (Indian Horse-Chestnut).—No tree has been more undeservedly neglected than this. Introduced from the Himalaya about the middle of the last century, it has remained one of the rarest of all hardy trees. Its foliage is handsomer than that of *Æ. Hippocastanum*, being dark glossy green, the leaflets usually seven; its flowers are white with blotches of yellow and red; the panicles are sometimes 12 inches high, and they open five or six weeks later than those of the common species. A very valuable ornamental tree. Some, but very few, trees in England are 60 to 70 feet high.

Æ. octandra (Sweet Buckeye).—The commonest of the N. American species in our gardens, this is a handsome round-headed tree not often more than 40 feet high with us. The leaflets are five or seven, downy beneath, usually 5 or 6 inches long. Flowers yellow, in panicles 7 inches high, opening in May and June. Var. *purpurascens*, found wild in the Allegheny Mountains, has purple or red flowers.

There are several hybrids between this and *Æ. Pavia* (see "Shrubs for Amateurs"), beautiful in flower and dwarf in habit, such as *Lyonii*, yellow and pink; *sanguinea*, scarlet; *versicolor*, yellow and red; and *Whitleyi*, rosy-red. All these are charming for small gardens.

Æ. plantierensis is a valuable hybrid between common horse-chestnut and *Æ. carnea*. It is very like the former in leaf and growth, but is not so vigorous, and its flowers are charmingly suffused with pink. Raised at Plantières, near Metz.

Æ. turbinata (Japanese Horse-Chestnut).—With a general resemblance to the common species, this has a stiffer, sturdier habit, and is much slower growing in this country. The leaves are the largest in this genus, each of the five or seven leaflets being often over 1 foot long and 4 to 6 inches wide. Flowers creamy-white, appearing a fortnight later than those of *Æ. Hippocastanum*. A fine tree at Westonbirt frequently bears good seed.

Æ. Wilsonii (Wilson's Horse-Chestnut).—Introduced from Hupeh, China, in 1900, this is still uncommon. It is a fine tree with panicles of white flowers as much as 16 inches high. The foliage, too, is handsome, the usually seven leaflets 8 to

12 inches long. It is quite winter hardy, but liable to injury by late spring frosts.

Ailanthus (Tree of Heaven).

One of the finest of deciduous hardy trees, with pinnate leaves 1 to 1½ feet long, which are made up of fifteen to over thirty leaflets, these being the more numerous on vigorous young trees. Each leaflet is 3 to 6 inches long, ovate, pointed, with one to three teeth at each side near the base, each tooth bearing a conspicuous gland beneath. The tree, which is unisexual, grows 50 to 70 feet tall, and the bark of the trunk and large branches is marked with many grey fissures. The female tree bears reddish winged fruits, giving a good effect when the crop is large. A good town tree. Another species, *A. Vilmoriniana*, is chiefly distinguished by its spiny young shoots. Both are natives of China and both are distinguished from all other hardy trees with pinnate leaves by the glandular teeth at the base of the leaflets. They like a good loamy soil and are easily increased by root cuttings.

Alnus (Alder).

The alders are chiefly valuable for growing in damp places, but most of them succeed in ordinary deep loam. They are of little value for poor dry soils. The common alder, *A. glutinosa*, admirable for banks of streams and ponds, need not be grown in the garden, but it has some distinct varieties. All the alders are deciduous, producing the male flowers on slender catkins which are usually abundant and give very pleasing effects in early spring; the seeds are borne on woody fruits that resemble small cones. They can be propagated by seeds, some by cuttings put in the ground as soon as the leaves fall.

A. cordata (Italian Alder).—A fine tree, the handsomest of the large alders, growing 80 feet high, with broad, pointed, heart-shaped leaves of dark, glossy green and up to 4 inches long. Male catkins opening in March, usually in clusters of

three, each 2 to 3 inches long. Fruits 1 to 1½ inches long, usually in threes also. Native of Corsica and Italy, and loves a place by the waterside.

A. firma (Many-nerved Alder).—A small tree, slenderly branched and of elegant form, well distinguished among alders by the many-ribbed, narrowish, long-pointed leaves, 3 or 4 inches long. Three forms are known, the handsomest of which is distinguished by the name *multinervis*, whose leaves have as many as twenty-four of the parallel ribs. Japan.

A. glutinosa (Common British Alder).—Usually of narrow, pyramidal habit; leaves broadest towards the apex, where they have several teeth. Fruits ½ inch long, numerous in the cluster. Varieties which may be planted in the garden are: *Aurea*, with golden-yellow leaves, and *imperialis*, with leaves deeply divided into narrow lobes and very elegant.

A. incana (Grey Alder).—This is now being largely planted for timber because it succeeds in the coldest, dampest places. It is well distinguished from common alder by the close grey down beneath the leaf. Its variety *incisa* is a handsome tree with deeply cut leaves, the narrow, toothed lobes reaching nearly to the mid-rib. One of the most ornamental of alders for cold, damp places. Europe.

A. nitida (Himalayan Alder).—A tall tree distinguished by its large lustrous leaves, 3 to 6 inches long, half as wide. A handsome tree, distinct from most of the alders in opening its flowers in September. Thrives well by the waterside.

Amelanchier (Juneberry).

Three species of amelanchier that attain the dimensions of trees, although only small ones, deserve mention. All are deciduous. The commonest and best known of them is *A. canadensis*, the East American Juneberry, which is usually 20 to 30 feet high, with a dense head of slender branches and twigs, the leaves oval, 1½ to 3 inches long. The pure white flowers open in April on short racemes at the end of short twigs. So profusely are they borne that the tree becomes a mass of

white; unfortunately its beauty is short-lived, and a week will see it through. It has, however, a second season of beauty, for its foliage turns an exquisite soft red in autumn. Eastern N. America.

A. alnifolia, the West American Juneberry, is a more erect, less elegant tree, but of about the same height as the preceding. Its white flowers come in similar profusion, but in more compact clusters and from two to four weeks later. The leaves are rounder than those of *A. canadensis*, and toothed only at the terminal part. Western N. America. The third species is *A. asiatica*, the Chinese Juneberry, scarcely distinguishable from *A. canadensis* except that it does not flower until the middle of May.

For other shrubby kinds, see "Shrubs for Amateurs."

Aralia chinensis (Chinese Angelica Tree).

More commonly known as *Dimorphanthus mandschuricus*, this tree is quite distinct from any other except a little-known species from N. America (*A. spinosa*). It has a gaunt habit, few branches and extraordinarily thick young shoots, often over 1 inch in diameter, more or less spiny, bearing large, doubly pinnate leaves 2 to 3 feet long and almost as wide, made up of numerous ovate leaflets 3 to 5 inches long. Flowers small, white, produced in early autumn in large panicles 1 to 2 feet long, composed of globose clusters about 1 inch wide. There is a variety whose leaves are edged with creamy-white, and another similarly variegated with golden-yellow, both very striking. These trees are rarely seen more than 10 to 20 feet high in England and should not be treated very generously at the root; otherwise they are apt to grow sappy and suffer in winter. China and Manchuria.

Arbutus.

Evergreen trees belonging to the heath family, with pitcher-shaped, white, or pink-tinted flowers $\frac{1}{4}$ inch long, produced in

clusters. They are quite hardy except in our most inclement localities. They do not transplant well, and should be grown in pots until given a permanent position. A well-marked and very ornamental feature is the smooth, cinnamon-coloured bark, more or less characteristic of all the species. See also "Shrubs for Amateurs."

A. Andrachne is very rare in cultivation. It is a tree 20 feet or more in height and has oval leaves of a dark glossy green, normally (and except when young) without teeth. A native of Greece and other parts of S.E. Europe and Asia Minor.

A. hybrida is a natural hybrid between *A. Andrachne* and *A. Unedo*, found wild in Greece. Its leaves are always toothed. This is the commonest of the arbutuses in gardens, and is a very excellent and handsome evergreen 30 feet high, or even more in mild districts. It flowers in October and November and again in spring.

A. Menziesii (Madroña) (syn. *A. procera*).—This fine Californian tree is the largest, not only of all the arbutuses, but of all the heath family. It has been found 100 feet high in a wild state, although rarely; more often it is a much lower spreading tree, often with an enormously thick trunk. The leaves are normally without teeth, like those of *A. Andrachne*, but differ in the glaucous hue beneath. Flowers dull white, opening in May on broad erect panicles. The bark of the trunk is richly coloured.

A. Unedo (Strawberry Tree).—Well distinguished from the other species by its hairy twigs, narrower leaves ($\frac{1}{2}$ to $1\frac{1}{2}$ inches wide) and its large, globose, spiny, orange-red fruits $\frac{3}{4}$ inch wide. It blossoms on drooping panicles from October onwards. Wild on the shores and islands of the Killarney Lakes and in S.E. Europe, usually in limestone districts. Often very handsome in fruit.

Betula (Birch).

There is no group of deciduous trees better marked than the birches, especially by the very frequently silvery, peeling bark of the trunk. The male flowers are borne in slender drooping

catkins in spring, the yellow anthers frequently giving a pretty effect. The differences between the various species often consist in rather obscure technical characters, a consideration of which is unsuited to these pages. They are all easily cultivated and range naturally from 60 to 100 feet in height, thriving well in loamy or even light sandy soil.

The white birches of Britain, which Linnæus called *B. alba*, consist really of two species—*B. verrucosa*, which is distinguished by its warty young twigs, and *B. pubescens* with downy ones, not warted. The former is the more elegant tree, its leaves being smaller and its twigs pendulous. It succeeds very well in poor soil and is abundant on the dry Surrey heaths, on which its silvery trunks make a very characteristic feature. The following are good varieties of it: Var. *pendula Youngii* has a very weeping habit and makes an attractive lawn tree, whilst var. *fastigiata* resembles a Lombardy poplar in form. Var. *dalecarlica* (Swedish birch) has deeply cut leaves, and is a graceful tree wild in Scandinavia; var. *purpurea* has purple leaves. The other British birch, *B. pubescens*, affects moister places and is common in the glens of the Scottish Highlands. Other excellent birches with silvery trunks are *B. papyrifera*, the Canoe birch of N. America; *B. Ermanii* and its var. *nipponica* from Japan, the latter a shapely tree; and *B. Jacquemontii* from the Himalaya.

B. nigra, the River birch of N. America, has a curiously shaggy, almost black bark; that of the Cherry birch (*B. lenta*), also N. America, is of a similar hue. *B. Maximowiczii* from Japan is remarkable among birches for its large leaves, heart-shaped, and 3 to 6 inches long, and for its long male catkins. *B. utilis* from the Himalaya has a very charming reddish-brown bark. *B. albo-sinensis*, recently brought from China, promises to be an attractive tree.

Broussonetia papyrifera (Paper Mulberry).

A deciduous tree of usually widespreading habit, chiefly interesting for its bark being used by the Japanese for making

paper. It has large, softly woolly leaves, and the male flowers come in short twisted catkins. Native of China, but now much cultivated in various parts of the world. It likes a sunny spot.

Buxus (Box).

Besides the common box (*B. sempervirens*), wild on Box Hill, near Dorking, and elsewhere in England, which is usually seen in gardens as a shrub, but is capable of becoming a small tree 15 to 20 feet high, with a trunk 1 foot in diameter, there is another, found wild in the Balearic Isles and Spain, called *B. balearica*. Like the common box, it is evergreen, but differs in its leaves being of a less glossy green and of greater average length. The shoots are not so downy, but stouter. A tree becoming 30 feet high, not, in my opinion, so ornamental as our native species. Both are easily propagated by cuttings and thrive on limestone formations. See also "Shrubs for Amateurs."

Carpinus (Hornbeam).

Very hardy, handsome, deciduous trees related to the filberts, of which one species is a native of Britain, the others coming from Continental Europe, N. America, Japan, and China. They succeed in any well-drained soil of good or even medium quality, and are useful trees for limestone districts. They should be raised from seeds whenever possible, but the garden varieties have to be increased by grafting. The leaves are well characterized by their conspicuous parallel ribs. The seeds are produced in pendulous cluster of fruits, the most conspicuous part of which is the large toothed or lobed bract to which the seed is attached.

C. Betulus (Common Hornbeam).—A tree up to 80 feet high, with a grey trunk somewhat similar to that of the beech, but not so smooth, and frequently fluted. Pyramidal in a young state, it becomes round-headed with age. The oval, pointed, toothed leaves are 2 to 3 inches long, with ten to thirteen pairs of parallel veins. A valuable timber tree very

abundant in Epping Forest. The place for it is rather the woodland or park than the garden proper, but the following varieties are charming garden trees: Var. *columnaris*, an elegant slender tree approaching the Lombardy poplar in form; var. *pendula Dervaesii*, attractive in its pendulous branches; var. *pyramidalis*, of stiff pyramidal form and close growth; useful for formal arrangements.

C. caroliniana (American Hornbeam). — The North American counterpart of our native species, but by no means so fine a tree and rarely more than 40 feet high. Sometimes it turns a rich yellow or even scarlet in autumn.

C. cordata.—A tree up to 40 feet high, very distinct from the common hornbeam in the large heart-shaped leaves 3 to 5 inches long and 2 to 3 inches wide. With us it is inclined to be bushy rather than tree-like. Native of Japan. A variety (*chinensis*) with smaller leaves was introduced from China in 1901. Both have from fifteen to twenty pairs of veins.

C. japonica.—Another Japanese tree, attaining some 50 feet in height, differing from *cordata* in the more oblong, narrower leaves up to $4\frac{1}{2}$ inches long, with eighteen to twenty-four pairs of parallel veins. This tree frequently bears large crops of the pendulous fruit clusters, and then makes a pleasing picture.

C. laxiflora, a third species from Japan, and of about the same stature as the preceding. Only small specimens exist in this country. A variety from China called *macrostachya* is charming in spring on account of its purple young shoots.

C. Tschonoskii.—A native of China, Korea, and perhaps Japan. It is a pretty, small tree, very leafy, and with very hairy young shoots somewhat pendulous on young specimens. Leaves 2 to $3\frac{1}{2}$ inches long, ovate, taper-pointed, very hairy beneath on the veins, of which there are nine to twelve pairs. It has long been grown in European gardens under the synonym *C. yedoensis*.

Carya (Hickory).

Handsome deciduous trees native of N. America and related to the walnuts, but always easily distinguished by having solid

continuous pith, that of the walnuts being divided up into thin transverse layers with vacant air-spaces between. The leaves are always pinnate. Fruit a nut, somewhat like a walnut, that of *C. olivæformis*, the pecan, being one of the best of all edible nuts, but the tree is not hardy in most parts of Britain and has never borne fruit here. The hickories have been too much neglected in gardens; they make stately trees and are particularly handsome as young or half-grown specimens on account of their magnificent foliage, which, in most of the species, turns a glorious yellow in autumn. They like a good deep loam, and, as they hate root disturbance, should be put in permanent places as young as possible.

C. alba (Shell Bark Hickory).—So called because the bark of the trunk breaks off in great flakes. Leaves made up of five leaflets, the three terminal ones the largest, and from 5 to 7 inches long by 2 to 3 inches wide. One of the most notable of hardy, fine-foliaged trees, usually turning a beautiful yellow in September. Ultimately 80 to 100 feet high. On young trees the leaflets will be as much as 12 inches long, the whole leaf over 2 feet long.

C. amara (Bitter Nut). A tree up to 100 feet high, distinguished from all other cultivated hickories by the bright yellow winter buds. Leaflets usually seven, but occasionally five or nine, to each leaf, 2 to 6 inches long, $\frac{3}{4}$ to $2\frac{1}{2}$ inches wide, the lower ones the smallest. The commonest and quickest growing of hickories cultivated in this country.

C. porcina (Pig Nut).—A tree 80 to 90 feet high. Leaflets five or seven, the terminal ones 5 to 7 inches long, 2 to 3 inches wide. Very hardy and thriving well in Britain. There is a tree 80 feet high at Kew.

C. tomentosa (Mocker Nut).—A singularly handsome tree with magnificent leaves, sometimes nearly 2 feet long on young trees, made up usually of seven leaflets, the terminal one being 5 to 8 inches long, half as wide, the lower ones gradually decreasing in size. The leaves have a pleasant fragrance, especially in damp weather or on dewy mornings, and they turn a fine yellow in autumn. A tree 60 feet and upwards in height.

Castanea (Sweet, or Spanish, Chestnut).

There are about six species of chestnut known, but only one of them (*C. sativa*, the Spanish chestnut) need be mentioned here. This has no botanical relationship with the horse-chestnut, although the seeds are rather similar. The leaves of Castanea (never divided into leaflets) are oblong, pointed, 6 to 9 inches long, with many parallel ribs, and the flowers are unisexual, the male ones coming in July on long slender catkins. Probably introduced by the Romans from Italy, there are many splendid trees in England, some over 100 feet high and over 20 feet in girth of trunk. Individual trees vary much in the size and quality of the nuts they produce; superior selected forms are cultivated in France, such as "Gros Merle" and "Marron de Lyons." There are two handsomely variegated forms, one whose leaves are edged with creamy white, the other with rich yellow. There is also a curious form—*heterophylla*—some of whose leaves are so deformed that they may be 12 inches or more long, but narrowed in places to $\frac{1}{2}$ inch or less in width.

The Sweet Chestnut is easily raised from its nuts, but is intolerant of lime in the soil.

Castanopsis chrysophylla (Golden Chestnut).

An evergreen tree, native of California, which does not seem likely to get more than 40 feet high in Britain. Of dense, bushy habit, with a smooth-barked trunk, the most remarkable feature of this tree is the golden-yellow scurf that covers the under-surface of the leaves. These are 2 to 3 inches long, not toothed, lustrous dark green above. The nuts, like those of the Spanish chestnut (to which the tree is related) are enclosed in prickly burrs and are well flavoured. An attractive and interesting small tree, which should be raised from seed. Apparently a lime hater.

Catalpa.

Several of the most handsome of all hardy flowering trees belong to this genus. They are deciduous, with the leaves arranged in pairs or in threes at each joint, very large and soft in texture. The flowers appear at the end of the leafy shoots in July and August in large clusters. Catalpas are moisture-loving trees and love a deep rich loam. Propagated by seeds which are produced in long, cylindrical pods 1 to 2 feet long, but only $\frac{1}{4}$ to $\frac{1}{2}$ inch thick.

C. bignonioides (syn. *C. syringæfolia*) (Indian Bean).—This N. American tree is undoubtedly the best of all the catalpas; so beautiful is it in bloom that no garden which can find room for it should be without it. It is rarely more than 30 to 40 feet high, often wider than tall, with long-stalked leaves 4 to 10 inches long and nearly as wide. Flowers tubular at the base, with spreading frilled margins; $1\frac{1}{2}$ inches long and wide; numerously clustered in panicles 8 to 10 inches long and as much broad; white spotted with yellow and purple in the tube. Var. *aurea*, leaves wholly and permanently rich yellow. One of the best trees with coloured leaves.

C. speciosa (Western Catalpa).—Very like *bignonioides* in general appearance, this is a taller, less spreading tree. The flowers scarcely differ from those of the previous species in colour, size, or shape, but they are in smaller panicles and open a fortnight earlier. A valuable timber tree in N. America, this is not so good for gardens as *bignonioides*, and does not flower so early in life.

Other catalpas are *C. Teasiana*, a hybrid between the two species just mentioned; *C. ovata* (syn. *C. Kæmpferi*) from China, with distinctly lobed leaves and smaller flowers; *C. Duclouxiana* and *C. Fargesii*, both new species from Western China with small panicles of pinkish flowers.

Cedrela sinensis (Chinese "Cedar").

Belonging to the same type of fine-foliaged trees as the black walnut and the tree of heaven, this handsome Chinese species

has been too much neglected. It has pinnate leaves 1 to 2 feet long, composed of eleven to twenty-three leaflets, each about 4 inches long, slenderly pointed. Trees raised from seed introduced by Wilson in 1908 have grown in height 2 feet and more annually. It has not borne flowers yet in this country, but they appear in large terminal panicles and are white and fragrant.

Celtis (Nettle Tree).

About a dozen species of deciduous trees belonging to this genus are in cultivation, but they have no beauty of flower, nor possess any striking qualifications in foliage or habit. *C. occidentalis* (the sugarberry) is a neat tree up to 40 or 50 feet high in Britain, with ovate leaves 2 to 4 inches long, half as wide, slenderly pointed, and sharply toothed. Flowers small, greenish. Fruit globose, $\frac{1}{3}$ inch wide, purple when ripe. This species will sufficiently represent the genus in most places. Its var. *crassifolia* has larger, more downy leaves. Both come from the E. United States, and are related to the elms.

Cercidiphyllum japonicum.

A large deciduous tree, native of China and Japan, of distinct appearance, and desirable for the charming hues of rich red and yellow its leaves acquire in autumn. They are more or less heart-shaped and 2 to 4 inches long, borne opposite each other along slender shoots. I have never seen it so fine in Britain as it is on the Continent and in New England. Mr. Mark Fenwick, who succeeds exceptionally well with it at Stow-on-the-Wold, Gloucestershire, believes it is nowhere so happy as by the margin of a stream. It is the largest of the deciduous trees of Japan. The flowers have no beauty.

Cercis Siliquastrum (Judas Tree).

This beautiful tree has been cultivated in England for over three hundred years, yet it is too rarely seen, for few trees are more delightful in May, when nearly every branch, old or

young, is crowded with its purplish-rose flowers. Individually they are shaped rather like pea blossom, only very much smaller and only $\frac{1}{2}$ to $\frac{3}{4}$ inch long. The leaves are very characteristic, being roundish with a heart-shaped base, 3 or 4 inches wide, scarcely so long, greyish-green. This tree likes full sunshine, a good loamy soil, and is easily raised from seed. It is rarely more than 30 feet high. Native of S. Europe and the Orient, and the tree on which, according to legend, Judas hanged himself. There are other species from N. America and China, but this is by far the best of the genus.

Cladrastis.

The only well-known member of this genus is the "yellow wood," *C. tinctoria* (known also as *Virgilia lutea*), a round-headed deciduous tree 35 to 50 feet high in this country. It has a grey trunk, pinnate leaves made up of five to nine oval leaflets, the terminal ones the largest, and up to 4 inches long. The white flowers come in June in drooping panicles 1 foot or more in length, each flower about 1 inch long, pea-shaped. A beautiful and distinct tree in shape, flower, and foliage, the last turning bright yellow in autumn. N. America.

C. sinensis.—A Chinese species, still very rare. It attains about the same height as the American one, and has white flowers, but the leaf has a good many smaller leaflets, the panicle is more or less erect, and the flowers are smaller and very much more numerous. It flowers in July and is a very attractive tree.

Cornus (Cornel).

There are two well-marked sections of this genus: one has numerous small flowers produced in flattish clusters sometimes several inches wide; in the other the chief floral beauty is made by four to six large bracts, coloured and shaped like petals, in the centre of which the true, but very small, flowers are crowded in a small ball-like cluster $\frac{1}{2}$ inch or so wide. Several shrubby species are dealt with in "Shrubs for Amateurs." All like a good deep loamy soil.

THE HIGHCLERE HOLLY, ILEX ALTACLARENSIS.

C. capitata (Bentham's Cornel).—An evergreen tree only hardy in the mildest counties, where it makes a bushy tree 30 to 40 feet high with narrowish dull green leaves 3 to 4 inches long. Belonging to the second group described above, its real flowers are minute and inconspicuous, but are subtended by from four to six sulphur-yellow bracts, each 1½ to 2 inches long, ¾ to 1½ inches wide. Fruit fleshy, strawberry shaped, 1 to 1½ inches wide, crimson. Native of India and China, beautiful in fruit as well as in flower.

C. controversa.—A deciduous tree ultimately 30 feet or more in height, with flat, horizontal branches. Leaves dark glossy green above, glaucous beneath, 3 to 6 inches long, half as much wide. Flowers white, about ½ inch wide, produced in flattish clusters 4 to 6 inches across in June and July. Fruit globose, blue-black, ¼ inch wide. China and Japan. There is a variegated form, which has narrower leaves edged with yellowish-white. These are the only tree-like cornels with alternately arranged leaves.

C. macrophylla.—Related to the preceding (with which it is often confused) and having similar fruits and similar broad, flattish clusters of white flowers, individually of about the same size, but duller. The leaves, however, are opposite and considerably larger, and the tree flowers a month later. China and Japan.

C. Nuttallii.—This, the most magnificent of all the cornels, has been found in a wild state in Western N. America sometimes 80 to 100 feet high. It belongs to the group with a small globose cluster of inconspicuous flowers, subtending which, however, are usually six (but occasionally four or eight) fine bracts, cream coloured at first, but subsequently tinged with pink, and from 1½ to 3 inches long, 1 to 2 inches wide, making a "flower," as it is usually called, like one of the large-flowered clematises. This fine tree does not like transplanting, and should be given a permanent place early. Although hardy at Kew, succulent shoots of young trees are liable to be injured by winter cold. The flowers reach the bud state by autumn, but do not open till the following May. Trees flower at 6 to 8 feet high.

Corylus (Hazel).

The shrubby hazels are well known, but there is one attaining the dimensions of a tree that is not. It is *C. Colurna*, popularly known as the "Constantinople nut" or "Turkish hazel," a round-headed or pyramidal deciduous tree 40 to 70 feet high, with hazel-like leaves 3 to 5 inches long and nearly as wide. Its male catkins are 2 or 3 inches long, and when freely hung with them the tree is quite attractive. But neither they nor the nuts are freely borne except after hot, dry seasons. The nuts are in clusters, each one with a large, conspicuously fringed and bristly husk. Other tree species are *C. chinensis*, from China, and *C. Jacquemontiana* from the Himalaya.

Cotoneaster.

The most tree-like cotoneaster is *C. frigida*, and this often requires training and keeping to a single lead, with the gradual removal of lower branches, to get it away from the shrubby state. Its magnificent crops of brilliant red fruits make it, in my experience, the finest of all cotoneasters. It is 38 feet high with Sir Herbert Maxwell in Wigtownshire. Himalaya.

Cratægo-mespilus.

Three hybrids between hawthorn (*Cratægus*) and medlar (*Mespilus*) have been given this name. One of them is a natural hybrid produced by cross-fertilization of the flowers; the other two were obtained by grafting the medlar on the hawthorn, and (like the well-known *Laburnum Adamii*) are known as "graft hybrids." They first appeared on a tree in a garden near Metz at the place on the main stem where stock and scion had united. All flower in late May.

C.-M. Asmeresii.—One of the graft hybrids just mentioned, and a very graceful and pretty small tree. Leaves rather like those of the hawthorn, but greyish and downy. Flowers white, becoming pinkish later, 1 inch wide.

C.-M. Dardari.—The second of the graft hybrids, but approaching the medlar much more than the previous one, the leaves being oblong, 1½ to 4 inches long, not lobed, but sometimes toothed. Flowers white, 1½ inch wide. This tree has the curious faculty of producing amongst its own branches those of true medlar, true hawthorn, and of the other hybrid, *C.-M. Asnieresii*, or four distinct kinds on the same tree.

C.-M. grandiflora.—A very leafy tree up to 30 feet high, the lower branches pendulous. Leaves oval, 2 to 3 inches long, often lobed. Flowers pure white, 1 inch wide, in pairs or three together. Found wild in France as a natural hybrid. Often known as *Mespilus grandiflora* or *M. Smithii*.

Cratægus (Hawthorn).

Owing to a very large number of new species having been found in N. America, this genus is now a most unwieldy one. But in this work we need only concern ourselves with the older and better known kinds, especially as many of the newer ones bear a close resemblance to them, and, in any case, are not in commerce, and therefore not available for general cultivation.

None of the thorns are large or even middle-sized trees; most of them range from 20 to 30 feet in height, but some are amongst the smallest of genuine trees. Nearly all are armed with thorns, and all are deciduous. Except *Prunus*, no genus affords so many appropriate and beautiful lawn trees. They are all very hardy, preferring a good loamy soil, either with or without lime. Except for some varieties of our native hawthorn, the flowers are always white and the clusters 2 to 3 inches wide.

C. Azarolus (Azarole).—Although quite hardy, this is a rare tree in this country, but common enough in S. Europe, where it is grown for its edible fruits. These are ¾ to 1 inch wide, globose, orange-yellow or red when ripe. The white flowers are ½ inch wide, in clusters 2 to 3 inches in diameter. Orient. June.

C. Carrierei.—A hybrid raised in France from a rare

Mexican species (*C. stipulacea*) fertilized by the pollen of an unknown kind. It is a very handsome tree, both as regards flowers and fruit, the former 1 inch wide, produced during June in clusters 3 inches across; the latter orange-red, globose, ¾ inch wide, remaining on the tree during much of the winter.

C. coccinea (Scarlet Haw).—This flowers in May, and its pendulous fruits are bright red, globose to rather orange-shaped, ½ inch wide. N. America.

C. cordata (Washington Thorn).—A charming and distinct thorn up to 30 feet high, of graceful habit. Leaves triangular in main outline, but lobed and toothed, 1 to 3 inches long, glossy green. Flowers ½ inch wide in clusters 2 to 3 inches across. Fruit orange-shaped, scarlet, ¼ inch wide, remaining long on the tree. This flowers in July, later than any other species of hawthorn. N. America.

C. Crus-Galli (Cockspur Thorn).—A spreading, flat-topped tree with mostly horizontal branches, very formidably armed with rigid slender thorns, at first 1½ to 3 inches long, but increasing in size and becoming branched as they get older. Leaves narrowish, 2 to 4 inches long, smooth and shining. Flowers ⅔ inch wide, with pink anthers. Fruit ½ inch wide, red, globose, persisting till early spring. N. America. A very distinct and desirable tree, rarely more than 15 feet high.

C. Leeana (Lee's Thorn) (*C. Dippeliana*).—A hybrid of which *C. tanacetifolia* is believed to be one parent. It is a distinct and handsome thorn, one of the prettiest, indeed, in bloom, each flower being ¾ to 1 inch wide, opening in mid-June. The leaves are 1½ to 3 inches long, deeply divided into seven, nine, or eleven lobes.

C. macracantha (Large-spined Haw).—Of all the thorns, this is the most remarkable in its armature of spines, which are not only very numerous, but 4 or 5 inches long. It is quite good also in flower and fruit, the former being ¾ inch wide, the latter bright crimson, globose, ⅜ inch in diameter. N. America.

C. mollis (Red Haw).—Closely related to *C. coccinea*, this is at once distinguished by the softly downy, larger leaves, which are often 4 inches long and as much wide. The flowers are 1 inch across, with yellow anthers; fruit rich red, nearly

1 inch in diameter, but falling early. A beautiful thorn in blossom. N. America.

C. monogyna (Common Hawthorn or May).—This, the common hedge-plant of England, is also one of the typical flowering trees of our country, whose charm and beauty have been the theme of many a lyric. As an isolated tree it will grow 20 to 30 feet high, or even more, elegant in shape, and blossoming about mid-May, filling the air around with its fragrance. Very seldom is it in blossom by May 1st, but we must remember it was under the Old Style calendar, or twelve days later, that its association with the festivals of that date occurred. Some authorities have united it with another English thorn to form one species under the name *C. Oxyacantha* (*q.v.*), but it is distinct in the haw containing only one seed (the other having two or three), also in its more deeply lobed leaves.

The well-known red or scarlet thorns belong to *C. Oxyacantha*, but there is a variety of *monogyna* called *Sestcriana* which has double red flowers. Var. *inermis compacta* is a dwarf form entirely devoid of thorns; var. *semperflorens* blossoms from May to August, and is so dwarf and slow-growing that a plant twenty years old may be only 3 feet high; var. *stricta* has quite erect branches and is very distinct in habit.

The most remarkable variety is the Glastonbury thorn (*præcox*), which often flowers in midwinter. The legend about the original tree (long since disappeared) is that Joseph of Arimathea, when at Glastonbury preaching Christianity, prayed to God that a miracle might be granted him to convince the inhabitants of the Divine nature of his mission. He thrust his staff into the ground, and, although it was Christmas Day, it straightway burst into flower and leaf.

C. orientalis (Oriental Thorn).—A flattish, spreading tree from the Orient, with the leaves cut into several narrow oblong lobes. Flowers $\frac{3}{4}$ inch across, opening in early June. Fruit coral-red or yellowish-red, $\frac{3}{4}$ inch wide. A distinct and very handsome tree both in flower and fruit. It has scarcely any thorns.

C. Oxyacantha (Hawthorn).—This is the second and less

common British thorn. It is of the same height and general character as *C. monogyna*, and the flowers are outwardly the same, but, as pointed out above, each flower has two or three styles, and each haw two or three seeds instead of only one. The leaves also are less deeply lobed. The best double white, double red, and single red thorns belong to this species. "Paul's double scarlet" is the best of the reds, and *candida plena* of the whites. Very beautiful lawn trees.

C. pinnatifida.—A distinct Chinese thorn, almost without spines, whose deeply lobed leaves are up to 4 inches long and have unusually long stalks. Flowers $\frac{3}{4}$ inch across; fruit red, $\frac{5}{8}$ inch in diameter.

C. prunifolia.—The origin of this very fine thorn is not definitely known, but it is undoubtedly American either actually or by descent; it may be a hybrid. A round-headed tree of 15 to 20 feet high, its brilliant green, roundish leaves 2 to 3 inches long and nearly as wide. The flowers open in June, each $\frac{3}{4}$ inch wide; fruit brilliant red, globose, $\frac{5}{8}$ inch in diameter. Considering the beauty of its blossom, the profusion of its fruits, and the bright crimson of its autumnal foliage, we may regard this as on the whole the most beautiful of the thorns, although, of course, it has not the peculiar attraction of the red and double red-flowered forms of *C. Oxyacantha.*

C. punctata.—An Eastern N. American species, old in gardens, giving fine displays of blossom in early June, followed by large deep red haws $\frac{3}{4}$ to 1 inch wide, specked with the paler dots to which it owes its name. The leaves have conspicuous parallel veins. Judging by the frequency with which one finds this thorn in long-established gardens, it must have been popular at one time.

C. tanacetifolia (Tansy-leaved Thorn).—Of the same type as *orientalis* in leaf and in the absence of spines, and native of the same region, this is very well distinguished by its large yellow fruits with the odour and flavour of an apple. A curious characteristic is the attachment to the base of the fruit of one or more moss-like bracts. An interesting and handsome small tree.

Cudrania triloba (Silkworm Thorn).

Interesting as one of the trees with whose leaves the Chinese feed their silkworms, this small deciduous tree has no colour beauty of flower or of leaf to recommend it. The flowers are green and produced in July in ball-like clusters $\frac{1}{3}$ inch wide; when freely hung with these the tree is not without attraction. It is unisexual, the female tree bearing hard, glossy, orange-shaped fruits $1\frac{1}{2}$ inches wide. Leaves 2 to 4 inches long, frequently shallowly three-lobed. Related to the mulberry.

Cydonia vulgaris (Quince).

Belonging rather to the orchard than to the garden proper, a notice of the quince is, perhaps, scarcely in place here, but the large, untoothed, rich green leaves, the pink or white flowers 2 inches wide, and, above all, the large, pear-shaped fruit 4 inches long, fragrant, and pale, shining golden yellow, combine, with a quaint growth and often crooked trunk, to make a small tree of no inconsiderable beauty. Its native country is not definitely known. The Portuguese variety (*lusitanica*) and one from Serbia called "Vranja quince" are the best.

Davidia.

What are now regarded as two distinct species of this genus have been introduced from W. China. Both are deciduous trees attaining 60 to 70 feet in height, very luxuriant in foliage, the vividly green leaves being 4 to 6 inches long, three-fourths as wide, with about eight pairs of prominent parallel veins. In *D. involucrata* the under-surface is very downy; in *D. Vilmoriniana* (syn. *D. lœta*) it is smooth and sometimes glaucous. The great floral feature of the davidias is made by a pair of bracts, at the base of which the true flowers are congregated in a ball-like cluster. These bracts are white and similar to the leaves in size and shape, each pair hanging inverted and loosely on a

slender stalk from beneath the branches in May. Fruit like a small green plum, containing one hard bony seed. The davidias like a deep loamy soil and are impatient of dryness at the root. *D. involucrata* is much the rarer, and has not yet flowered in cultivation. The other has blossomed in many places, and when garnished with its hundreds of large bracts makes a quite unique feature in gardens. It ripens seed abundantly, but this often takes two or even three years to sprout.

Diospyros.

The N. American persimmon, *D. virginiana*, is a fine deciduous tree with a remarkably picturesque trunk, owing to the bark being deeply carved into roughly rectangular blocks. *D. Lotus*, the date plum, a native of China, is a much smaller tree with us, and rarely over 30 feet high. Both these are hardy and have oval, dark green leaves without teeth and 3 to 5 inches long. Flowers inconspicuous. The trees are unisexual, and the female form of *D. Lotus* occasionally bears small orange-shaped fruits which rarely ripen and are never edible in this country.

A third species, *D. Kaki*, known as "Kakee" in Japan, is less hardy, but will ripen its fruits on a warm south wall. They are frequently sold in London fruitshops as "persimmons," having been introduced from the south of France. A native of China.

Ehretia acuminata.

A deciduous tree 15 to 20 feet high, with oval, toothed leaves 3 to 7 inches long, and fragrant white flowers borne in pyramidal panicles 4 to 6 inches long. Each flower is $\frac{1}{4}$ inch wide. A tree copiously in flower is quite effective, especially as it blossoms as late as August, and although rare it is well worth growing. There is a good example near King William's Temple at Kew. China and Japan.

Eucalyptus (Gum Tree).

Coming from Australia and Tasmania, the eucalypts are naturally tender in this country, and although a large number can be grown in the south-western counties, only one species is really hardy in the Home Counties. This is *E. Gunnii*, a somewhat variable tree wild in Tasmania and S. Australia. From Tasmania came the well-known form, *whittingehamensis*, the original and famous specimen of which grows at the Earl of Balfour's seat in East Lothian, and is now some 70 feet high. One of its progeny at Kew is 50 feet high.

E. coccifera and *E. urnigera*, rather similar trees, also native of Tasmania, are the next hardiest, but they rarely survive more than a few years near London. They like full sunshine, but need protection from wind, as, owing to the very quick growth, they are apt to be blown over when young. It is a good plan to cut off the upper third of lanky young trees to induce them to thicken and strengthen the trunk. They transplant badly, and should be grown in pots until planted in permanent places. The leaves of *E. Gunnii* on young trees are round, silvery, 1 to 2 inches wide. After the juvenile state is past they become narrow, pointed, grey-green, and 3 or 4 inches long.

Eucryphia.

For the majority of gardens the only member of this genus that can be grown satisfactorily is *E. pinnatifolia*, but a second one, *E. cordifolia*, is hardy in places thirty miles or more south of London. They are beautiful trees whose garden value is enhanced by their flowering as late as July and August. They like either a peaty soil or an open, well-drained loam, and I think are best where a shadow is cast over them in the middle of the day. At any rate, the flowers last longer in such a place. Both are natives of Chile, and should be raised from seed.

E. cordifolia.—An evergreen tree 30 feet high, with dull green leaves 2 to $3\frac{1}{2}$ inches long, heart-shaped at the base, very

downy underneath. Flowers 2 inches wide, with usually five petals, pure white, the stamens forming a conspicuous cluster in the centre.

E. pinnatifolia.—A nearly deciduous or partly evergreen tree 15 to 25 feet high, with pinnate leaves made up of three or five oval or ovate leaflets, each $1\frac{1}{2}$ to $2\frac{1}{2}$ inches long, dark shining green. Flowers $2\frac{1}{2}$ inches wide, pure white, petals four, stamens forming a large cluster. A hybrid between these two species has been raised by Lt.-Col. Messel at Nymans in Sussex, and called *E. Nymansay*.

Evodia.

Deciduous trees, not of large size, belonging to the rue family, with pinnate leaves set opposite each other on the branches. Flowers in broad, flattish clusters, dull white; seeds black and shining. All the hardy species are natives of China and Korea, of comparatively recent introduction. They make rather handsome small trees, *E. glauca*, *E. hupehensis*, and *E. velutina* being perhaps the best. *E. hupehensis* produced fine crops of its red fruits at Kew in 1925.

Fagus (Beech).

The beeches of the Northern Hemisphere (for those found south of the Equator, see *Nothofagus*) are as much like each other as they are distinct from other hardy trees. The smooth grey trunk, the deciduous glossy green leaves with parallel veins, the small green male flowers crowded in a ball-like cluster at the end of a slender stalk, and the triangular chestnut-brown nuts enclosed in a woody husk, are the chief characteristics of the genus, and all are well illustrated by our native species. They thrive in chalky soil. The only species commonly grown are the American beech (*F. ferruginea*) and the British *F. sylvatica*, the latter of which has developed many varieties.

F. ferruginea (American Beech).—A tree 70 to 80 feet high, with the curious faculty of throwing up suckers from the roots, these sometimes forming a thicket round the parent tree. The

leaves differ from those of our native beech in having ten to fifteen pairs of parallel veins; they are 2 to 5 inches long, more pointed, more regularly toothed, and comparatively narrower than in *F. sylvatica*. Owing to most cultivated trees being grafted on the latter, the suckering habit is rarely, if ever, seen in this country.

F. sylvatica (Common Beech).—One of the noblest trees of Europe, often 100 feet high, and sometimes nearly 150 feet. At Newbattle Abbey a famous tree has a trunk girthing 22 feet; another very beautiful one in the park at Ashridge, Bucks, is over 130 feet high, its trunk clean, smooth, and free from branches up to 80 feet. The leaves have about eight pairs of veins. The following are the best and most attractive of the many varieties of this tree:

Var. *cuprea* (Copper Beech).—A seedling variant from the purple beech, with leaves of a coppery red.

Var. *fastigiata* (Dawyck Beech).—A slenderly fastigiate form.

Var. *heterophylla* (Fern-leaved Beech).—A very beautiful tree of shapely rounded form, the leaves assuming various shapes, often deeply lobed like some ferns. As garden trees this and the weeping beech are perhaps the best.

Var. *pendula* (Weeping Beech).—There are several types of weeping beech, the commonest of which has large branches spreading in low arches or almost horizontally, from which slender branchlets hang almost perpendicularly. Others, like *pagnyensis* and *remillyensis*, are more umbrella-like in form when grafted high. Var. *miltonensis* has a perfectly erect trunk, the branches only being pendulous.

Var. *purpurea* (Purple Beech).—This well-known and popular tree—the largest and most imposing of its colour—has several forms varying in the depth of purple colouring, amongst the darkest being *nigra* and *atropurpurea*. Only a small proportion of its seeds come true.

Var. *rotundifolia*.—An elegant small tree of erect shape. Leaves $\frac{1}{2}$ to $1\frac{1}{2}$ inches only in width.

There are several variegated forms, the prettiest of which is var. *tricolor*, streaked and edged with pink and white; and one, var. *zlatia*, with yellowish foliage.

Fraxinus (Ash).

The larger ashes, like our native *F. excelsior* and the N. American *F. americana*, are amongst the more valuable of the world's large trees, yielding a timber that is highly esteemed where toughness is desired, such as for cart-shafts and oars. There are, however, other species smaller and better adapted for the ordinary garden. The ashes are gross feeders and succeed best in a heavy stiffish loam either with or without lime. Normally the leaves are oppositely arranged and pinnate, and all the species are deciduous. The genus consists of two natural groups: the flowering ashes (*Ornus*), whose flowers have both a corolla and a calyx and are produced numerously in good-sized panicles on the current season's growth; and a group to which the common ash belongs, whose flowers have no beauty, are without calyx or corolla, and are produced on the previous year's wood.

F. augustifolia (Narrow-leaved Ash).—A very elegant tree up to 60 or 70 feet high, with leaves about 8 inches long; leaflets seven to thirteen, 2 or 3 inches long, narrow and quite smooth. The most ornamental of the larger ashes as regards foliage. S. Europe and N. Africa.

F. dimorpha (Algerian Ash).—A small tree, very distinct among ashes by reason of the small leaves, which are only 2 or 3 inches long, with usually seven or nine leaflets. A rather dainty tree from N. Africa. In Afghanistan and the Himalaya is found a very similar ash, *F. xanthoxyloides*, differing chiefly in its minutely downy shoots.

F. excelsior (Common Ash).—In the north-east of England this is a common hedgerow tree, but the tallest trees I know of are at Cobham Park in Kent, some over 140 feet high. Its large black winter buds, opposite pinnate leaves, and the flat membranous extension of the fruits ("keys") distinguish it clearly from all other native trees. It is too big and hungry a tree for gardens. Much more suitable for them is the weeping ash, var. *pendula*. This should be grafted on a tall stock of the type, and will in time form a very elegant weeping tree of

umbrella-like shape. Planted on a lawn, it makes a charming summer arbour. Var. *heterophylla*, the one-leaved ash, is a remarkable variety, the leaflets (normally nine or eleven in common ash) being reduced to one, which is 3 to 6 inches long, $1\frac{1}{4}$ to $2\frac{1}{2}$ inches wide. The seeds of this variety come true to the extent of about 50 per cent., the remainder producing common ash.

F. Mariesii (Maries' Ash).—A small tree that flowers very prettily and is the best of all ashes for small gardens. It is, perhaps, 15 to 20 feet high, with leaves made up of three or five leaflets, its creamy-white flowers appearing abundantly in June in panicles 4 to 6 inches long. It is scarcely less ornamental during the following months, when the fruits turn purple. China.

F. Ornus (Manna Ash).—This well-known tree is sometimes over 50 feet high, but is usually much smaller. It has foliage rather similar to the common ash, but the winter buds are grey; the habit also is denser and more leafy. Flowers rather dull white, the panicles very abundantly borne in May. It is quite an ornamental tree, much better fitted for the garden than common ash. Native of S. Europe and Asia Minor, where manna sugar is obtained from it by incision of the bark.

F. quadrangulata (Blue Ash).—People fond of curious trees may like to grow this, which is remarkable for its square young shoots. It is not a large tree in this country, but attains some 60 to 70 feet at home in N. America.

Other ashes suitable for the park and woodland are *F. americana*, *F. pennsylvanica*, and *F. velutina*, all from N. America.

Gleditschia (Honey Locust).

The remarkable trees constituting this genus belong to the pea family. They have beautifully divided leaves sometimes of an almost fern-like grace, through their pinnate or doubly pinnate division into numerous leaflets. Another characteristic is the extraordinary spininess of the trunks, the spines being often 6 to 12 inches long, branched, very stiff, stout, and sharp;

sometimes the trunks are almost covered with them. The flowers are green and small, not ornamental, but the flat, thin, scimitar-shaped pods, often 6 to 12 inches or even more long, add to the interest of these trees.

The commonest species (yet it is not very common) is *G. triacanthos*, deciduous like all in the genus, and a tree 60 feet high in this country, the leaflets ½ to 1½ inches long, as many as thirty or more to one leaf. Turning a clear yellow in autumn, it is very beautiful then. Another species, *G. caspica*, from the region of the Caspian Sea, is a stiffer, smaller tree, the trunk even more formidably armed. The leaflets are larger and fewer. For small gardens *G. japonica* is the best; in Japan it is a middle-sized tree, but with us is small and slow-growing; with no beauty of flower, it is unsurpassed among hardy trees for grace and luxuriance.

These three trees are perfectly hardy and thrive even in light soils.

Gymnocladus (Kentucky Coffee Tree).

A deciduous tree native of N. America, where it sometimes is over 100 feet high, but very rarely half that height in England. It is closely related to the honey locusts and has similar long flat pods. The flowers are greenish and have no beauty; male and female occur on different trees. The young shoots are very thick, and the beauty of the tree is in the large doubly pinnate leaves, sometimes 2 to 3 feet long and two-thirds as much wide; the numerous leaflets are ovate, 1½ to 2½ inches long, and of the richest green. Of rugged aspect in winter, it is a singularly handsome tree in full foliage.

Hippophae (Sea Buckthorn).

A notice of *H. rhamnoides*, our native species, is given in the companion volume "Shrubs for Amateurs," for it is very often shrubby. It is, however, capable of becoming a tree 15 to 30 feet high if trained to a single stem. Its narrow silvery

leaves in summer and its orange-coloured berries in winter render it very ornamental most of the year. It is unisexual, one male being sufficient to fertilize half a dozen female plants. A Himalayan species, *H. salicifolia*, is more genuinely a tree (one at Kew has a trunk 5 feet in girth), but its leaves have not the grey colour so pleasing in the other, and I have never seen it so abundantly cropped with fruit. *H. rhamnoides*, an excellent seaside plant, should always be selected.

Hoheria populnea.

It is only in the southern and western maritime counties that one can hope to make a success of this charming tree in the open air. It comes from New Zealand and belongs to the mallow family, having as a near relation the beautiful *Plagianthus Lyallii*. It is an evergreen tree up to 30 feet high, with a slender trunk, and is very variable in leaf. In the typical form the leaves are about 4 inches long and half as much wide, but in var. *lanceolata* they are smaller and comparatively narrower. Flowers pure white, coming in clusters on the leafy shoots during July, each flower about 1 inch wide (but variable), with a bunch of stamens in the centre. New Zealand.

Idesia polycarpa.

A unisexual, deciduous tree which is rarely 20 feet high in this country, although one at Borde Hill in Sussex is 10 feet higher than that. It has a rather horizontal mode of branching, the young shoots being pithy and rather thick. Leaves heart-shaped, 5 to 8 inches in length, long-stalked, dark green above, glaucous beneath. The small yellow-green flowers come in panicles and have little beauty, but in the female tree are followed by fruits the size of small peas, and ultimately of a brownish-red colour. It does not seem to be a long-lived tree and has no particular merit. China.

Juglans (Walnut).

Large deciduous trees with pinnate leaves, the pith of the young shoots being divided up into thin transverse discs with air-spaces between, a character which affords a good distinction from the nearly related hickories (*Carya*), whose pith is not broken up in the same way. The nuts, of course, are also very characteristic and are well typified by those of the common walnut, the hickories being the only other hardy genus of trees that have similar ones. Walnuts like a good loamy soil, a sunny spot, and, as they transplant badly, should be given a permanent place as soon as possible—say when three years old.

J. cinerea (Butter Nut).—A large tree in N. America, but for some reason rarely attaining any great height with us. Its leaves are 1 to 1½ feet long, made up of usually nine to fifteen leaflets, well distinguished from those of its relative, *J. nigra*, by the thick soft down that covers them beneath. The nuts are pointed at one end.

J. cordiformis.—This Japanese tree may be taken as the type of a group of walnuts to which *cathayensis*, *mandschurica*, and *Sieboldiana* also belong. They are all very similar in their leaves, which are remarkable for their size, especially in young trees, and not infrequently a yard long where the soil is rich. The leaflets are oblong, 3 to 7 inches long, and from eleven to nineteen of them are carried by a single leaf. As the trees get older the leaves become smaller, but always remain the most striking in this genus. The male catkins are often 1 foot long and give a singular and pleasing effect by their abundance. The kernel of the nut is edible, but it is not often that they reach that condition in Britain; they are produced in clusters. In my experience *J. cordiformis* and *J. cathayensis* are the most satisfactory of this group. The latter is from China; *mandschurica* is from Manchuria and N. China; *Sieboldiana* is from Japan. They differ chiefly from each other in the shape of the nut.

J. nigra (Black Walnut).—Undoubtedly the best of the N. American walnuts in Britain, this makes a singularly handsome tree with its long leaves and numerous leaflets, the former

PYRUS SCHEIDECKERI IN FRUIT.

QUERCUS MIRBECKII, ABOUT THIRTY YEARS OLD.

being 1 to 2 feet in length, the latter 2 to 5 inches, with sometimes over twenty of them on a single leaf. They are pleasantly fragrant. It has reached a stature of over 100 feet in this country, but a small or medium-sized tree is an ornament to any garden.

J. regia (Common Walnut).—Of this well-known tree the only form that claims notice here is the cut-leaved one—var. *laciniata*—whose much-divided leaves render it one of the handsomest of its class.

J. rupestris.—Perhaps the smallest of the walnuts, this Texan species is also an attractive tree in its foliage, the leaves being 6 to 12 inches long, with seven to over twenty leaflets, each 1 to 3 inches long, $\frac{1}{4}$ to $\frac{3}{4}$ inch wide, their narrowness giving the tree an elegant appearance.

Koelreuteria.

Two trees of this genus, both deciduous and both natives of China, are known to be hardy. They do not get to be more than 30 to 40 feet high in this country, very rarely as high. The leaves are pinnate or doubly pinnate, and the yellow flowers are in erect pyramidal panicles 6 to 12 inches high; each flower is about $\frac{1}{2}$ inch wide, with four petals. Fruit inflated, conical, $1\frac{1}{2}$ to 2 inches long. The better-known species is *K. paniculata*, which, in hot summers especially, gives a very pretty display in July and August. Its leaves are 9 to 18 inches long, with nine to fifteen leaflets. A second species, *K. apiculata*, is very similar to the other, but the leaves are often doubly pinnate at the lower part. It is still rare. These trees must have full sunshine; their blossoming is more regular and more copious on the Continent.

Laburnum.

The laburnums are well known as perhaps the most beautiful of all hardy trees with yellow flowers, and even the smallest gardens should have the two common species represented.

They are extremely hardy, they grow in any soil that is of moderate quality, and they are very easily raised from seed. Natives of Europe, but not wild in Britain.

L. alpinum (Scotch Laburnum).—From the common laburnum this differs in its larger leaflets, longer racemes, and in flowering a fortnight or three weeks later. In some of its best varieties, such as *grandiflorum* and one called "latest and longest," the racemes are 15 inches or more long. Where there is only room for one laburnum, this species or one of its forms should be grown.

L. vulgare (Common Laburnum).—In this species the racemes are rarely more than 9 or 10 inches long, and the three leaflets each average 1 inch less in length. There are a number of varieties, one of the best of which is *Alschingeri*, found wild in Eastern Europe.

Of several hybrids between the above the best is *L. Watereri*.

A very remarkable graft hybrid, known as *L. Adamii*, was obtained through grafting *Cytisus purpureus* on *L. vulgare* by a nurseryman called Adam, near Paris, in 1825. The original shoot sprang from the place where stock and scion had united. When it blossomed it was found to have flowers intermediate between those of the parents in size and colour (yellowish-purple); the leaves also are intermediate in size. This tree has the singular faculty of producing branches of both parent species, so that all three—viz., *Cytisus purpureus*, *Laburnum vulgare*, and *L. Adamii*—occur on one tree. See also *Cratægo-mespilus*.

Liquidambar styraciflua (Sweet Gum).

Three species of liquidambar are in cultivation, but this is the only one generally available. It is a N. American tree, rarely more than 40 to 70 feet high in Britain, with five or seven-lobed leaves about 6 inches wide, so like those of a maple that the tree is often mistaken for one; in the maples, however, the leaves are always arranged oppositely on the shoots, in this they are alternate. It has no beauty of blossom, but is one of the most beautiful of autumn trees, the leaves changing then to

brilliant red and orange. A species from Asia Minor, *L. orientalis*, is a much smaller tree with us, although 100 feet high in S. Europe. Its leaves are like those of our field maple in size and shape, but do not colour in autumn. The third species, *L. formosana*, is Chinese, and not so hardy as the other two, although Wilson in 1908 introduced a variety called *monticola*, which has so far escaped injury by frost. Its young shoots and leaves are purple.

Liriodendron (Tulip Tree).

Two deciduous trees related to the magnolias constitute this genus. The better known of them is *L. Tulipifera* from N. America, a magnificent tree sometimes 150 to 190 feet high in a wild state, and occasionally over 100 feet in this country. The other, *L. chinense*, is from China, and a much smaller tree. In leaves and flowers they are much alike, the leaves differing markedly from those of any other hardy tree. They are 3 to 8 inches long, more in width, the end cut off almost straight across, the lower part developing several shallow pointed lobes. Occasionally a leaf approaches a rectangular outline. The flowers appear in June and July, the six petals forming a tulip-like blossom $2\frac{1}{2}$ inches wide, greenish-white. The Chinese species has not yet flowered in this country. Its leaves are paler beneath than those of *L. Tulipifera*, and the latter has the mid-rib slightly prolonged beyond the blade more frequently than in *L. chinense*.

Maackia amurensis.

A small deciduous tree, often a shrub, with pinnate leaves 8 to 12 inches long, made up of seven to eleven ovate leaflets $1\frac{1}{2}$ to 3 inches long, and erect racemes of close-packed, pea-shaped, dullish-white flowers. The raceme is 4 to 6 inches long, and the individual flower $\frac{1}{2}$ inch long. July and August. Manchuria, Korea, and Japan. Related to *Cladrastis*, but inferior both in foliage and flower.

Maclura aurantiaca (Osage Orange).

The chief attraction of this small deciduous tree is its fruit, which is seldom produced in Britain. The tree is unisexual, and both male and female flowers, therefore, are needed to obtain fruit, which is like an orange in shape, yellowish-green, and 2 to 4 inches across, not edible. The leaves are 2 or 3 inches long, and the branches are thorny, so much so that it is used as a hedge plant in N. America (its native country) and on the Continent. It is an interesting tree belonging to the mulberry family, but as plants have to be a considerable age before they flower and their sex becomes evident, not many people grow it. It has no beauty of blossom.

Magnolia.

The more shrubby species of magnolia have been discussed in "Shrubs for Amateurs," and it now remains to treat of the species that become genuine trees, although, as has been pointed out in the companion work, some of them may with equal propriety be regarded either as trees or shrubs. It is desirable to get the magnolias in their permanent places early, as they do not like root disturbance. They thrive in a warm, deep, well-drained, loamy soil or a peaty one. Transplanting should be done in early May or in September. All are deciduous except when noted as otherwise. The fruits are cone-shaped or cylindrical, several inches high, and often richly coloured.

M. acuminata (Cucumber Tree).—Although perhaps the least effective of all magnolias as regards blossom (the flower is dull greenish-yellow and the narrow petals only 2 or 3 inches long), this is a fine leafy tree of good habit. The leaves are oval, 5 to 10 inches long. There are many examples 40 to 60 feet high in England. The popular name refers to the cucumber-like shape of the very young fruits. N. America.

M. Campbellii.—A Himalayan tree of large size which has proved hardy at Kew, but only shows its best in the milder counties. Leaves oval, 6 to 10 inches long. Flowers opening

in spring on the leafless branches, each about 8 inches wide, the petals of thick texture, deep rose. A beautiful tree, now 30 to 40 feet high in some gardens.

M. conspicua (Yulan).—A low tree, rarely more than 30 feet high in Britain. Leaves 3 to 6 inches long, 2 to 4 inches wide. Flowers of the purest white, appearing before the leaves in March and April, the petals rather erect at first, 3 inches long. One of the loveliest of early-flowering trees, the blossom, however, liable to injury by frost. China.

M. cordata.—Related to *M. acuminata*, but a much smaller tree, often merely shrubby, leaves smaller; flowers of a canary-yellow inside the petals, and about 3 inches wide. N. America.

M. Delavayi.—An evergreen tree with large leathery leaves 8 inches to over 12 inches long, 5 to 8 inches wide, dull green above, glaucous beneath. The flowers are a dull, rather ineffective white, 8 inches wide, with the usual fleshy petals of this genus. A very fine foliaged tree and very striking as seen fully in the open in Cornwall, but only hardy enough for a wall at Kew. W. China.

M. Fraseri (syn. *M. auriculata*).—A small tree, very distinct in the shape of the leaves, which are like a gigantic arrowhead in shape; they are 8 to 15 inches long, about half as wide. Flowers scented, pale yellow, becoming almost white, 8 to 10 inches wide, opening in late May and June. N. America.

M. grandiflora.—A fine evergreen tree 60 to 80 feet high in its native S. United States, also in S. France and Italy, this is never more than a small tree with us, but is well known as a wall plant, where, given a position facing south, it usually flowers well. The shining, leathery, dark green, oval leaves are 6 to 10 inches long, felted beneath when young. Flowers creamy-white, very fragrant, 8 to 10 inches wide, opening in late summer and autumn. Vars. *augustifolia* and *lanceolata* have narrower leaves.

M. hypoleuca.—A lofty tree, native of Japan. Leaves 8 to 16 inches long, half as much wide, blue-white beneath. Flowers creamy-white, 8 to 10 inches wide, with a central mass of rich purplish-red stamens. This wonderful tree unfortunately is often short-lived in this country.

M. Kobus.—Naturally a large tree up to 70 or 80 feet high in Japan, this is not more than half as high yet in this country. It blossoms on the leafless shoots in April, the flowers being white, 4 inches wide. Leaves 4 to 7 inches long. It has to be 15 to 20 feet high before it flowers at all freely. Japan.

M. macrophylla.—A very extraordinary magnolia on account of the size of the leaves, which are usually 1½ to 2 feet long, occasionally 3 feet, and from 8 to 12 inches wide; they have a broad notch at the base, as in *M. Fraseri.* Naturally it is a very hardy tree, but suffers badly from late spring frosts, which destroy the young growths and set up decay in the branches; very rare in consequence. Flowers dullish white, about 1 foot wide. N. America. July.

M. salicifolia (Willow-leaved Magnolia).—A charming slender tree with erect branches and narrow leaves 2 to 4 inches long, ¾ to 1½ inches wide. Flowers pure white, opening in April on the leafless shoots. The bark is fragrant like the lemon-scented verbena. Admirable for a small garden. Japan.

M. Soulangeana.—The commonest and perhaps the most accommodating of all magnolias, this eventually makes a small rounded tree 20 feet or more high, although it blossoms well as a quite small shrub. It is a hybrid between *M. conspicua* and *M. obovata*, and the flowers, which are about 5 inches wide, have the petals white inside, always more or less purple outside. It flowers from April until early June. See also "Shrubs for Amateurs."

M. tripetala (Umbrella Tree).—A tree usually 15 to 25 feet high, of spreading, rather gaunt habit. Leaves 1 to 1½ feet long, half as wide. Flowers creamy-white with loose spreading petals 5 inches long. N. America. May and June.

Other magnolias in cultivation, but very rare, are: *Dawsoniana*, *Nicholsoniana*, *officinalis*, *Sargentiana*, all from W. China. There is also a hybrid between *conspicua* and *Campbellii*, called *Veitchii*.

Meliosma Veitchiorum.

A remarkable deciduous tree from W. China, of stiff, erect habit, unfortunately very rare. It has extraordinary thick young shoots and fine pinnate leaves 1½ to 2 feet long, with nine or eleven leaflets, each 4 to 6 inches long. Flowers small, white, borne in pyramidal panicles 1½ feet high, 1 foot wide, not yet seen in England.

Mespilus germanica (Medlar).

Long known in the orchard, the medlar has some attraction also as a small garden tree. It has a low habit, often a crooked trunk, and warped branches, copious leafage, and solitary white or pinkish flowers 1 inch wide, followed by quaint fruits 1½ to 2 inches wide. The medlar in a wild state is armed with stout spines, but in the cultivated form they have almost or quite disappeared. Europe. May and June.

Morus (Mulberry).

The common mulberry (*M. nigra*) is undoubtedly the best—really the only—species worthy of general cultivation. Apart from the large crops of fruit it bears, an old mulberry is always picturesque, with its short, usually bent trunk and heavy canopy of leaves. The white mulberry, *M. alba*, the tree on whose leaves the silkworm is chiefly fed, is hardy enough in the main, but its young shoots are often cut back in winter. Still, it gets to be a considerably larger tree than *M. nigra*, but has no particular merit. The fruit is whitish, not so good in flavour as the dark red ones of the common species. Both are easily propagated by the leafless shoots or small branches and are not particular as to soil.

Nothofagus (Southern Beeches).

Although in a botanical sense closely related to the beeches of the Northern Hemisphere (*Fagus*), the beeches found in S. America and Australasia are very distinct in general appearance. They have the same three-cornered nuts, but the leaves are usually much smaller. There are both evergreen and deciduous species. Except that a bleak, windswept spot should be avoided for them, they require no special conditions, succeeding in either loamy or peaty soil. It has to be remembered, nevertheless, that some of them are tender. The Australasian species will not succeed out of doors at Kew, but five S. American ones have gone through all the winters of the last ten to twenty years without injury. They are *N. betuloides*, *Dombeyi*, *antarctica*, *obliqua*, and *procera*, the first two evergreen. In the southern and south-western counties the following can also be grown: *N. cliffortioides*, *Cunninghamii*, *fusca*, *Menziesii*, all evergreen.

N. antarctica (Antarctic Beech).—As seen in this country, this has a tendency to be bushy and spreading, but it makes a pleasing small tree, distinct among deciduous ones by the smallness of its leaves, which are only $\frac{1}{2}$ to $1\frac{1}{4}$ inches long, usually set in two rows on the twigs. Chile.

N. betuloides is undoubtedly happier in such counties as Devon and Cornwall than in our ordinary inland localities. There it is a most attractive evergreen tree, as much as 50 feet high in places, its leaves only $\frac{1}{2}$ to 1 inch long, forming dense but not ungraceful masses. Increased only by layers in the absence of seed. Chile, etc.

N. cliffortioides.—An evergreen tree 50 feet high in New Zealand, with downy, wiry twigs, and leaves only $\frac{1}{4}$ to $\frac{1}{2}$ inch long, distinguished by having no teeth on the margins. Very elegant when in good health.

N. Cunninghamii.—A large evergreen tree, in Tasmania sometimes approaching 200 feet in height; as yet only 50 to 60 feet high in the British Isles. Leaves diamond-shaped or triangular in outline, $\frac{1}{4}$ to $\frac{5}{8}$ inch long, and from $\frac{1}{8}$ to $\frac{1}{2}$ inch in width.

N. Dombeyi.— No really severe winter has occurred since the introduction of this beech from Chile a few years ago so that I can say nothing definite as to its hardiness. It is an immense evergreen tree in its native home—one of the chief timber yielding trees there—but in a small state is an elegant tree with brown, shining bark and leaves about 1½ inches long. Easily increased by cuttings.

N. fusca.—An evergreen tree of the largest size in New Zealand. In the young trees as we know them the twigs are zigzagged, and the broadly ovate or rounded leaves ¾ to 1½ inches long; the latter turn red before falling.

N. obliqua.—Trees raised from seed brought from Chile by the late Mr. H. J. Elwes, in 1902, have succeeded extremely well, and some of them in twenty-three years are well over fifty feet high; the leaves are 1½ to 3 inches long, half as wide. This is a very elegant tree of slender columnar form in its young state, but makes a large tree with an enormous trunk in Chile.

N. procera.—With leaves very like those of a hornbeam in shape and size as well as in the numerous parallel ribs, this is quite distinct from all the other hardy southern beeches. Only introduced in 1913, the juvenile trees are of erect, stiff habit, but grow quickly. Increased by cuttings.

Nyssa sylvatica (Tupelo).

This N. American tree is valued chiefly for the rich red (or occasionally yellow) colours assumed by the foliage before it falls in autumn. It is scarce in this country, probably because it dislikes disturbance at the root and often fails to recover from transplanting. It should consequently be given a permanent place early. The oval leaves are 3 to 6 inches long, not toothed. Flowers of no beauty. A tree at Kew 50 years old is only about 30 feet high although quite healthy. It is, therefore, not a quick grower, although it gets to be 100 feet high at home. It likes a good deep loam.

Ostrya (Hop Hornbeam).

Three species belonging to this genus are cultivated: *carpinifolia*, native of Europe; *japonica*, native of Japan; and *virginica*, from N. America. They are closely related to the hornbeams and resemble them in foliage. They have also about the same ornamental qualities; that is to say, they are pleasant enough looking in foliage, have no particular attraction as regards blossom, but have interesting hop-like fruits, the seeds being enclosed in a small bladder-like husk. None of them makes a very large tree, the Japanese variety being apparently the largest; it is also distinguished from the other two by its soft, downy leaves. Given a good well-drained soil, they thrive well in our climate, being perfectly hardy. The timber is very hard, almost bone-like, and the American species is popularly known as "ironwood."

Oxydendrum arboreum (Sorrel Tree).

Flowering, as it does, as late as July and August, I think this small deciduous tree is undeservedly neglected. Although it was cultivated in England as long ago as 1752, it is not, and never has been, much grown. It belongs to the heath family, and bears its small, white, pitcher-shaped flowers in a pyramidal cluster 6 to 10 inches long. The smooth, narrowly oblong leaves are about 5 inches long; they open with a bronzy tint and turn a charming red in autumn. It should be raised from seeds, which are easily obtainable from American seedsmen. Well-drained soil, either peaty or loamy, suits it, and it probably has a dislike to lime. The leaves have slightly acid, sorrel-like taste.

Parrotia.

Two small deciduous trees belonging to the witch hazel family constitute this genus. *P. persica*, a native of N. Persia and the Caucasus, is a widespreading, low tree with rather horizontal branches and a grey, peeling bark. The leaves are

3 or 4 inches long, not so wide; rich green through the summer, they turn to lovely shades of gold and crimson in autumn. The flowers consist chiefly of red stamens; they are quite small, but are surrounded by rich brown bracts, giving altogether a pleasing effect on sunny days in March, when they usually open on the leafless branches.

The other species, *P. Jacquemontiana*, is from the Himalaya, a compacter tree with shorter leaves; the stamens are yellow and the petal-like bracts are white, forming a "flower" 1 to 2 inches wide. It blossoms most freely during April and May, but odd flowers continue to appear during the summer. It has no autumnal beauty and is inferior to the Persian species, which is an interesting, very hardy, and charming small tree.

Paulownia imperialis.

This remarkable tree, so magnificent in leaf and beautiful in flower, is very disappointing in our average climate. Winter cold will not harm it, for it succeeds perfectly in the environs of Paris, where the frosts are as severe as ours. But the flowers form in the autumn and remain in the bud state all the winter, opening naturally in May. Unfortunately they rarely survive the spring, being excited into a premature development by unseasonable warmth early in the year, only to be destroyed by severe weather later. The leaves on adult trees are 6 to 12 inches long and wide (much larger on younger ones), and the blue-purple flowers 2 inches long are like huge pentstemons in shape. In the western and south-western counties they quite frequently reach perfection. It is all a matter of their surviving the early spring months, either by being kept at rest by continued cold or being kept from injury by continued warmth.

Phellodendron.

Small, deciduous, unisexual trees belonging to the rue family and related to the evodias alluded to on an earlier page. They are rounded in habit and bear the pinnate leaves opposite each other on the shoots; these are usually about 1 foot long

and carry seven to fifteen leaflets. Flowers small, yellowish-green, followed in the female tree by round black fruits each ½ inch wide. Although handsome enough in foliage, they have no particular merit for the garden. The best-known species is *P. japonicum*, whose leaflets, each about 3 inches long and 2 inches wide, are covered beneath with a thick soft down. *P. Lavallei* and *P. sachalinense* have nearly smooth leaflets, longer and narrower. The phellodendrons are natives of China, Japan, Manchuria, and Saghalien. They need a good loamy soil.

Photinia.

In the maritime counties of the south and west, *Photinia serrulata* makes an evergreen tree 20 to 35 feet high. It has stout, leathery leaves 6 inches or more long, nearly half as wide, expanding a rich brownish-red colour; associated with the clusters, each 4 to 6 inches wide, of small white flowers, they give a charming spring effect. In autumn, too, when the older leaves turn red before falling, and the tree bears a crop of small red fruits, it is again very handsome. At Kew it does not get out of the shrubby state and is apt to be cut by late spring frosts. A native of China, related to the hawthorn.

P. villosa (syn. *variabilis*) is deciduous and has much smaller leaves and smaller clusters of white flowers; the former change to a beautiful red in autumn. Quite a small tree, native of China and Japan, and quite hardy.

Wilson introduced *P. Davidsoniæ* from Central China in 1900, and he describes it as one of the handsomest evergreen trees of that region. The leaves are about the size of those of a Portugal laurel. Flowers white, fruits orange-red. A tree 20 feet and upwards high, apparently very hardy.

Picrasma ailanthoides.

In Japan, where this tree is native, it is said to be one of the most beautiful for its autumn colour of all the trees of that country, which must be saying a good deal. At Kew, where it

has been grown for over thirty years, it has shown no particular merit in that respect, but that may be due to defects of climate or soil. It is a perfectly hardy small tree of graceful appearance, with pinnate leaves 1 foot or so long, made up of nine to thirteen leaflets; the flowers are small and green. I fear it is at present difficult to acquire, but is worth trying by anyone who can obtain it. The bark is excessively bitter.

Pistacia.

The tree which produces the pistachio nuts of commerce, used for flavouring and in confectionery, is *Pistacia vera;* that which produces "mastic," a resin chewed by the Greeks and Turks as a sort of dentrifrice, is *P. Lentiscus;* whilst a third, which yields a resinous juice known as "Chian turpentine," is *P. Terebinthus.* All these are natives of the Orient and have been held in high esteem there since ancient times. Apart from their interest, they have no garden value. *P. Terebinthus* is the only one really hardy. The one species of garden interest is a Chinese one, *P. chinensis*, introduced by Wilson, who describes its autumn colouring as a gorgeous crimson. It is naturally a large deciduous tree up to 80 feet high in China, but although perfectly hardy at Kew it grows slowly. The leaves are pinnate, 9 inches long, with usually ten or twelve leaflets of a lustrous green. Up to the present I fear it has been disappointing as regards its autumn tints. None of the pistacias have any beauty of flower.

Platanus (Plane).

The planes are undoubtedly to be included amongst the noblest deciduous trees of the Northern Hemisphere. They are also amongst the most distinct, for although the foliage resembles that of some of the larger maples, they are very well marked by the curious fruit-balls that hang from the branchlets in strings of two to six. The two kinds described below are very hardy and have adapted themselves completely to our climate. I do not remember to have ever seen a dead or dying

plane tree of either of these kinds, where it has been given a reasonably fair chance of growing and when once it has become established at the root. They are not particular as to soil except that it should be well drained, and they seem to bear drought or excessive rain with equal indifference. Still, they are sun-lovers and succeed better in the south than in the north.

P. acerifolia (London Plane).—This tree is not known in a wild state, and its origin is not definitely known. The latest investigations point to its being a hybrid between *P. occidentalis*, the American plane (probably not now in cultivation), and *P. orientalis*. It seems first to have been noticed at Oxford late in the seventeenth century. It is now the most common of London street trees, and is undoubtedly the most accommodating of all, thriving in the depths of the city even. There are some very fine trees in Lincoln's Inn Square, but to see the plane at its best one should go to Ranelagh, where there is a tree over 100 feet high, scarcely surpassed in magnificence by any in the country. A big old tree is a valuable possession, but the London plane is so common and so lacking in distinction as a small tree that it is only those, I think, with the benefit of posterity in mind who would plant it in their gardens.

P. orientalis (Oriental Plane).—A native of the Orient, this tree differs from the preceding in its handsomer, more deeply divided leaves and shorter trunk. Its habit is more rounded and much more elegant, but although to be distinctly preferred as a garden tree, it is only rarely planted. There are still trees on the banks of the Bosphorus in whose shade Godfrey de Bouillon and his Crusaders rested in 1069.

Populus (Poplar).

The poplars are deciduous, unisexual trees of the Northern Hemisphere, related to the willows, often of large size, and quick growing. It is, indeed, mainly for their rapid growth that several of them are tolerated in gardens. There is the Black Italian poplar, for instance. People, especially elderly ones, who have taken up a new residence and want a certain amount

of tree vegetation in the grounds quickly, will plant it or others of a similar type. Professional landscape gardeners, too, will sometimes plant them for the same reason, usually with the proviso that they must be removed in a few years when slower-growing and better trees have got sufficiently large. Generally this is forgotten or neglected, and the poplars develop into unmitigated nuisances, filling the ground with their greedy roots, becoming huge in trunk and gaunt in limb, starving out other things within their reach, every year adding to the expense and trouble of their ultimate removal. The sycamore is bad enough, but the common poplars are worse. Their one attraction is the red glow of the male catkins for a few days in spring, but these appear only on oldish trees.

There are, nevertheless, several poplars that are quite handsome trees where there is room for them, but they are mostly unsuited for the small garden.

P. alba (White Poplar).—In a small state this makes quite a pleasing feature during the summer by reason of the pure white under-surface of the leaves, of which in a breeze one gets short glimpses. It is fairly common in the Bournemouth chines. Native of Europe, not British. A more effective tree is its erect-growing variety, *pyramidalis* (Bolle's poplar), with much the habit of the Lombardy poplar, but not so slender. One defect of both is their habit of producing suckers from the roots.

P. canescens (Grey Poplar).—This makes a stately tree, very leafy and handsome. It is related to and often confused with *P. alba*, but the leaves are not so white beneath, and they never assume the maple-like shape often seen in that species. Occasionally 100 feet high. Britain.

P. Eugenei.—A hybrid between Lombardy poplar and another of the black poplar group. Of the quick-growing kinds this is the best, because it retains a columnar habit and does not develop the huge ungainly limbs so characteristic of the Black Italian. The original tree in a nursery near Metz, where it was raised, became in less than seventy years 150 feet high, with a trunk 7 feet in diameter. A valuable timber tree.

P. lasiocarpa.—A Chinese tree, remarkable, in a young state

especially, for the size of its leaves, the blade of which is often over 1 foot long and nearly as wide, the mid-rib and stalk red. Introduced in 1900, it has unfortunately not proved a success in many places, and appears to thrive best in the south and west.

P. nigra (Black Poplar).—This is the type tree of the black poplar group and is a native of Britain, often of river-banks and damp places. It gets to be of large size and is not suitable for most gardens. A neater form of it is the downy black poplar, var. *betulifolia*, distinguished from the type (which is smooth in leaf and shoot) by the downy leaf stalks and young twigs. There are some good trees of this variety in the Green Park.

The best-known form of this species is the Lombardy poplar, *P. nigra* var. *italica*, the commonest and most useful of all spire-like trees. A double row of Lombardy poplars, planted 8 feet apart each way, will give an effective screen for hiding unsightly objects like gasometers and factories in less time than any other tree. In good soil it increases in height 4 to 6 feet annually.

The American counterpart of the black poplar is *P. monilifera*, and it is from the hybridization of these two that the rank growers of the Black Italian type have originated.

P. tremula (Aspen).—A small or medium-sized tree 30 to 50 feet high, native of Britain, well known for the perpetual quivering of its leaves. For gardens the best form of this tree is the weeping form, var. *pendula*, which assumes, when grafted 8 or 10 feet high, an umbrella-like form, very charming in spring for the profusion of its grey male catkins, each 2 to 4 inches long.

Its American counterpart is *P. tremuloides*, which also has a pendulous variety, "Parasol de St. Julien," but is inferior to the preceding.

P. trichocarpa (Black Cottonwood).—This is a native of Western N. America, the country of giant trees, and reaches there a stature of 200 feet. It is the largest of all the poplars, and is succeeding well as a timber tree in this country. It is only suitable for fairly large gardens, but is worth growing, where room can be found, for the delightful balsamic odour it diffuses from the young shoots in spring and early summer.

A GOLDEN WEEPING WILLOW, SALIX VITELLINA PENDULA.

ONE OF THE MOST HANDSOME OF ORNAMENTAL TREES, SOPHORA JAPONICA.

Prunus.

This genus, as now constituted, is a large one and includes not only the plums (*Prunus* proper), but also the cherries (*Cerasus*), almonds (*Amygdalus*), peaches (*Persica*), apricots (*Armeniaca*), bird cherries (*Padus*), and cherry laurels (*Laurocerasus*). It thus includes a great variety of beautiful trees which add more to the floral beauty of gardens from March to May than any others. All except the cherry laurels (see "Shrubs for Amateurs") are deciduous.

No special treatment is needed by this group of trees. None of them is very large, *P. Avium*, the gean, which attains 60 feet in height, being the largest in this country. Most of them are small trees ranging between 15 and 30 feet high. They are very suitable for small gardens, especially those on a limestone formation. A word of warning is needed in regard to pruning. The removal of branches either back to the trunk or from a main limb is attended with danger. Large wounds do not heal over readily, and in several species are subject to what is commonly called "gumming"—that is, they continue to exude gum long after the wound is made, and very much weaken the tree. Another point is that no class of tree is more subject to the dreaded silver-leaf disease, which is caused by a fungus whose spores enter the tree by way of wounds, and for which no cure has yet been found. The use of tar for painting over wounds caused either through the removal of branches by saw or knife, or by accident, is in no class of tree so essential as in this. See notes on this subject, p. 15.

It will be most convenient to treat of the species under their respective groups, but a selection may here be made of the twelve best kinds for ordinary gardens: *Amygdalus*, *Avium flore pleno*, *cerasifera* var. *Blireana*, *Cerasus* var. *Rhexii*, *Davidiana*, *Mahaleb*, *Padus flore pleno*, *Persica flore pleno*, *serrulata*, *spinosa flore pleno*, *subhirtella*, *triflora*.

Almonds and Peaches.

Although the older botanists separated these, there is really no genuine distinction between them. Flowering at a usually inclement season, they should if possible be given a sheltered spot, and their beauty is never so well seen as when they have a dark background of evergreens such as holly or holm oak. The three following all get to be 20 to 30 feet high.

P. Amygdalus (Common Almond).—Amongst early flowering trees this is the one which gives the first real promise of spring. Its blossoms open normally in March, and, in one variety called *praecox*, usually in February, but of course in long, hard winters the flowering is inevitably delayed. A fine variety called *macrocarpa* has not only the largest fruits, but also the largest flowers—2 inches or even more wide.

P. Davidiana (David's Peach).—Native of China and one of the earliest flowering of this group. The flowers are white, 1 inch wide (in var. *rubra* pink), and very frequently open in January. A charming small tree when the season permits.

P. Persica (Peach).—Of the varieties of this tree grown for their flower beauty, the double-flowered ones are much the best. Their blossoming time follows immediately on that of the almonds, and the two together make a delightful display extending over six weeks. The richest coloured of the peaches is *magnifica*, with deep red flowers 1½ inches wide, but it does not appear to thrive as well as the double pink (*roseo pleno*), and is now difficult to obtain. For general merit this double pink, including a variant of it called "Clara Meyer," is unsurpassed. Where there is space for one only, it should be selected. A pure double white one (*albo pleno*) is very charming. The peach is believed to have originated in China, where it was cultivated for centuries before ever it was known in Europe.

Apricots.

The common apricot (*P. Armeniaca*), regarded as a flowering tree, has no claim to notice here, but the Japanese apricot

(*P. Mume*) has a double-flowered form with rosy petals that makes a very pretty tree in March. Each blossom is 1 to 1¼ inches wide, with many petals. It is known as *flore pleno;* there is also a double white one, *albo pleno;* both make charming small trees flowering at the same time as the almond.

Cherries.

P. acida.—The most attractive form of this European species, which is naturally, perhaps, a shrub, but as usually grafted makes a low bushy-headed tree, is var. *semperflorens* (All Saints' cherry). This flowers in April before the leaves appear, but the crop then is small; it commences, however, to blossom again in June, this time on the young leaf-bearing shoots, and continues more or less through the summer. Flowers white.

P. Avium (Gean).—A tree found wild in Britain, which need not find a place in the garden proper. Its variety *flore pleno* is, perhaps, the most beautiful of all hardy trees bearing white flowers. They open usually in early May, hanging clustered in amazing profusion from beneath the branches, are very "double," each 1½ inches wide, and of the purest snowy white. The tree grows 40 to 50 feet high.

P. Cerasus (Dwarf Cherry).—A small tree or even a bush, native of Britain, and the parent of the Morello cherries. The wild type need not be grown, but a double-flowered variety called *Rhexii* or *ranunculiflora* is a charming tree whose flowers rival in purity those of *P. Avium flore pleno*, and are of the same size. Being a much smaller tree, 10 to 16 feet high, it may be preferred for small gardens.

P. Conradinæ.—One of the newer introductions from China, a tree 30 to 40 feet high, with white or pink-tinted flowers that often open in February, and are therefore liable to injury by cold. Very fine in the warm counties.

P. incisa.—A very charming cherry that flowers in May. It gets its name from the much and deeply cut leaves. The pale pink blossom is usually very profuse. Japan.

P. Mahaleb (St. Lucie Cherry).—A beautiful tree of loose

free growth up to 40 feet high, with flowers in racemes 2 inches long, carrying six to ten flowers, pure white, fragrant, each $\frac{3}{4}$ inch wide. The best form of it is var. *pendula*, a very graceful tree.

P. serrulata (Japanese Cherry).—To this species belong many of the wonderful double-flowered cherries of Japan which are now in cultivation under their Japanese names. The flowers appear in April and May in unsurpassed profusion, wreathing the branches from end to end with clusters of blossoms varying in the different forms from pure white to glowing pink, 2 inches or rather more wide. No garden, however small, can afford to be without one or more of them. The varieties grown in nurseries as "Hisakura" and *Veitchiana* are as good as any of those readily obtainable; one sold as "Cheal's weeping" is the best of the pendulous ones; another, whose flowers appear later than any, is called *albo-rosea;* and one, whose flowers are suffused with greenish-yellow, is called "Ukon."

The cherry, also from Japan, known as *P. Sieboldii* or *P. Watereri*, is closely related to *P. serrulata*, but has very downy leaves. The flowers are similar to the best forms of that species, but open two weeks earlier.

P. subhirtella.—A beautiful Japanese cherry which comes into bloom about the end of March and lasts well into April before the more splendid forms of *serrulata* appear. As seen in England it is a small bushy tree, at present not more anywhere than 15 to 20 feet high. The flowers are pale rose, each $\frac{3}{4}$ inch wide, thickly clustered on the twigs. Its var. *pendula*, a very "weeping" tree with slender branchlets, is one of the most exquisite flowering trees of its habit of growth. It was long known in gardens as "Prunus pendula" and "Cerasus pendula." A remarkable variety is one named *autumnalis*, which commences in some seasons to flower in October, in other seasons from November and December onwards. When first introduced it was called *P. Miqueliana.*

P. yedoensis (Yeddo Cherry).—Although newly introduced, this is the cherry whose flowering is kept as a national festival in Japan. Wilson says over 50,000 trees are growing in the neighbourhood of Tokyo. There it grows from 40 to 50 feet

high, its white or pink flowers produced in April before the leaves, in clusters of two or more. They are slightly fragrant. There is a double-flowered variety, but I am not sure that it has been introduced.

Plums.

P. cerasifera (Cherry Plum).—A round-headed tree up to 30 feet high, valuable for producing its pure white flowers in March, occasionally in February. They are clustered densely on the twigs, each blossom $\frac{3}{4}$ inch wide. Fruit (rarely developed in England) a round red plum 1 to $1\frac{1}{4}$ inches wide. This is one of the most beautiful of early flowering trees, but even more so is its var. *Pissardii*, which blooms equally early and equally profusely, the flowers having a delicate blush tint. This variety is also beautiful after flowering when it bursts into leaf, the young foliage being a tender ruby-red, changing to claret colour, lastly to a heavy purple. Var. *Blireana* is a double-flowered form of Pissardii, with very beautiful rose-coloured flowers, and in regard to its blossom the finest of the cherry plum group.

P. spinosa, the well-known sloe or blackthorn of our hedgerows and copses, flowers in March and early April, its small, snow-white flowers most effective against the dark branches. It is sometimes 20 feet high, sometimes mere scrub, and makes a charming woodland feature in spring. In the garden it should be represented by its double-flowered form (*flore pleno*), which bears a profusion of tiny rosette-like flowers at the same time as the wild plant, but they last longer. Var. *purpurea* has purple leaves and pink-tinted flowers.

P. triflora (syn. *P. salicina*) (Japanese Plum).—The fruits of this species are sometimes seen in London fruitshops, imported from California and S. Africa. They are much more tapered at the top than our own plums are. I do not think it will have any value as a fruit-bearing tree with us, but is well worth growing for the wonderful profusion of its small white flowers opening in April. A tree 20 to 30 feet high, native of China.

Bird Cherries.

P. Padus.—The common bird cherry as seen wild in Britain is a pleasant tree for the woodland, but in the garden it should be represented by two of its varieties: (1) *flore pleno*, whose flowers are in the ordinary drooping or spreading racemes of the ordinary bird cherry, 3 to 6 inches long, white, fragrant, and lasting longer in beauty through being "double"; (2) *Watereri*, remarkable for the size of its racemes, which are 6 to 8 inches long, the individual flower ½ inch wide. The bird cherry is a tree of open, rather loose growth, and will grow 30 to 50 feet high. May.

P. serotina (Rum Cherry).—A North American tree of medium size in this country, and very handsome in summer by reason of its graceful habit and dark green, very lustrous leaves, rather like those of a Portugal laurel. As in our native bird cherry, the small white flowers are borne in cylindrical racemes 4 to 6 inches long in May. The young bark has a rather pleasant aromatic odour and a slightly bitter taste.

Ptelea trifoliata (Hop Tree).

A small deciduous tree with a short, often bent trunk and a low, spreading head of branches. Leaves composed of three leaflets, each 3 to 5 inches long. Flowers dullish white, borne in clusters 2 or 3 inches wide about midsummer. The most interesting feature of this tree is its fruits, each of which is a thin, flat disc like a hop, with the seed in the centre, very bitter. Great crops are usually borne by adult trees. It belongs to the rue family, and all the young parts are aromatically scented. The foliage turns a good yellow in autumn. An interesting, very hardy tree from N. America.

Pterocarya (Wing Nut).

The wing nut trees belong to the same family as the walnuts and hickories, from which they differ chiefly in the thin mem-

branous attachment, or "wing," to the nut, which is also much smaller. In one species, *P. Paliurus*, from China, this wing is ½ to 1 inch wide and transforms the fruit into a kind of disc 1½ to 2 inches wide. The leaves in all the kinds are long, pinnate, made up of numerous leaflets. The small green flowers are unisexual, the sexes separated on pendulous racemes, the female racemes the longer.

P. caucasica (Caucasian Wing Nut).—This fine tree is the only species generally known under cultivation, and it is not so much grown as it deserves to be. It will not succeed in boggy, ill-drained soil, but is very happy on the banks of a stream or lake, loving, as it does, abundant moisture at the root. The tree is naturally a large one, as much as 80 to 100 feet high, and forms a huge rounded head of branches. The leaves are 1 to 1½ feet long, with often over twenty leaflets, each 3 or 4 inches long. The female catkins are 1 to 1½ feet long, and a tree freely hung with them is a striking object.

The other kinds are uncommon and may be dismissed briefly. *P. stenoptera* is a Chinese species with the general appearance of the Caucasian one, but distinct because of the membranous "wings" on the main stalk of the leaf in the spaces between where the leaflets are attached. *P. Rehderiana* is a hybrid between these two species and is growing well in this country.

Pyrus.

This large genus is made up of at least four distinct types of tree besides a few shrubs, all deciduous. For the latter see "Shrubs for Amateurs." The trees are the pears (*Pyrus* proper), crabs (*Malus*), whitebeams (*Sorbus* or *Aria*), and mountain ashes (*Sorbus* or *Aucuparia*). These present great differences in general appearance, and some botanists have made three or four genera of them. They have, however, several characters that are common throughout, the chief of these being the fruit, which, whatever its size—and there is a wide gap between that of the apple and the mountain ash—has its several sections or "cells" separated from each other by a thin mem-

branous wall, and contains one or two seeds or pips, familiar to everyone in the core of an apple.

All the pyruses are easily cultivated; they like a deep loamy soil and have no dislike to lime. They should not be grown in shady positions.

Pears.

As an ornamental tree a large old common fruiting pear, *P. communis*, is really attractive in its graceful habit and wealth of white blossom. A good many species, at any rate, have no greater beauty and need no mention here. But *P. salicifolia*, the willow-leaved pear, deserves to be grown for its foliage as well as its blossom. The leaves, about 3 inches long by $\frac{1}{2}$ inch wide, are covered when young with a silvery down. These, with the small clusters of pure white flowers, make it very beautiful and conspicuous in spring. There is an elegant "weeping" variety of this pear, called *pendula*. Native of S.E. Europe and Asia Minor, and a small tree. No true pears are wild in America.

Crabs.

Of all the groups constituting the genus *Pyrus*, the crabs are certainly the most beautiful, regarded as flowering trees. Many of them also are very handsome in fruit. They are liable to be attacked by the "American blight," a white woolly aphis that usually affects the underside of the branches, scarring the bark. Spraying with an emulsion of paraffin and soft soap is a good remedy. Scale insects also infest the trunk and branches; for these a winter dressing of caustic soda should be applied. Some crabs are grown solely for the beauty of their red and golden fruits, one of the best of them being "John Downie."

P. baccata (Siberian Crab).—The cultivated tree of this name is probably not the true wild type. It may be a hybrid even. It is a beautiful tree 30 to 40 feet high, laden with pure white flowers in April, followed by a profusion of bright red fruits, each the size of a large cherry. In some seasons these remain on the twigs throughout the winter. Siberia.

P. cratægifolia (Thorn-leaved Crab).—A small round-headed tree, perhaps 10 to 15 feet high, native of N. Italy, far too rarely seen in gardens. The leaves resemble those of some thorns, being 2 to 3 inches long, half as wide, deeply lobed. Flowers pure white, $\frac{3}{4}$ inch wide, opening in June in very abundant clusters that wreath the branchlets from end to end. The crabs are small and not very brightly coloured, but the autumn foliage is often bright orange-scarlet. A charming small tree for lawns.

P. Eleyi.—A hybrid between *P. spectabilis* and *P. Niedzwetzkyana*, raised by Mr. C. Eley, of Bergholt in Suffolk. The leaves and young wood are purplish, the flowers a charming claret colour, and the fruits reddish-purple, conical, $1\frac{1}{2}$ inches long. A fine hybrid, beautiful in leaf, flower, and fruit. *P. aldenhamensis*, raised by the Hon. Vicary Gibbs, is very similar.

P. floribunda.—A hybrid of Japanese origin, *P. Toringo* being one parent. It ranks amongst the most beautiful of flowering trees and attains a height of 20 to 30 feet and an even greater width, forming a dense tangle of branches. The flowers are crimson in bud, rosy pink on opening, getting paler with age, so profuse as to cover the tree completely. The fruit has little beauty. Var. *atrosanguinea* is more richly coloured and the foliage a brighter green. April.

P. ioensis (Iowa Crab).—In gardens this species need only be represented by its double-flowered variety, *flore pleno*, often known as the "Bechtel crab." This has the largest flowers of any crab—2 to $2\frac{1}{2}$ inches wide—of a charming pale pink and delicately fragrant. It flowers in June. The type is wild in the Central United States.

P. Malus (Common Crab).—This, the tree from which the cultivated apple has originated, is not worth a place in the garden. Two forms occur in a wild state—one called *acerba*, or *sylvestris*, which has nearly smooth shoots and leaves; and *mitis*, with downy leaves. The latter is supposed to be the parent of the sweeter apples.

P. Niedzwetzkyana.—No doubt this is a form of *P. Malus*, but is remarkably distinct in the purplish-red colouring of its young leaves, flower, and fruit. The leaves become purple with

age. The crabs are conical, 2 inches long, and make a conspicuous feature in autumn. It was introduced from Siberia. Much of its colouring has descended to its hybrid progeny, of which *P. Eleyi* and *P. aldenhamensis* have already been mentioned. A third is—

P. purpurea, raised in France, whose other parent is *P. floribunda*. It is a graceful tree, the young foliage of a charming red, the flowers very abundant, purplish-red.

P. prunifolia.—An ordinary crab in leaf and flower, but rather notable for its fruits, which are about 1 inch wide, tapered slightly towards the apex, sometimes red, sometimes yellow (as in vars. *lutea* and *Rinki*), always pendulous. Large crops are usual and make a fine display. Siberia.

P. Schiedeckeri.—This is one of the hybrids so numerous in this section of *Pyrus*, and undoubtedly one of the very finest of the flowering kinds. A small bushy-headed tree, it will grow 15 feet or perhaps more high. The pale rose flowers appear in amazing profusion in early May, rather later than those of *floribunda*, one of its parents.

P. sikkimensis (Sikkim Crab).—Introduced from the Himalaya in 1849, this small bushy tree is still uncommon. It is very distinct on account of the thick furnishing of the older branches with stout spurs several inches long. Flowers white, very profuse. Fruit rather pear-shaped, dark red. An interesting tree of quaint form.

P. spectabilis.—A very fine flowering crab, but with no beauty in its fruits. It is a native of N. China, and, with the exception of the Bechtel crab, has the largest flowers in its group; they are nearly 2 inches wide, rich rose in the bud state, pale pink when fully open. A tree 20 to 30 feet high, ranking in merit with *floribunda* and *Schiedeckeri*.

Whitebeams.

In regard to their flowers, the members of this group fall far behind the crabs, for although they are borne in often large flattish clusters, they are usually of a rather dull white, and

soon fall. The leaves are large and handsome, often felted beneath, and are marked by prominent parallel ribs. The greatest beauty of the whitebeams is attained when they are in the fruiting state, the fruits being usually in large clusters and bright red. They are very well suited for limestone districts, most of them occurring wild on that formation.

P. alnifolia.—A small tree of neat, rather slender, erect habit, with alder-like leaves 2 to 3 inches long, green beneath. It produces large crops of bright red fruits each about $\frac{1}{2}$ inch long, which remain long on the tree. Japan and Korea.

P. Aria (Common Whitebeam).—A tree 30 to 50 feet high. Leaves 3 to 4 inches long, 2 to 3 inches wide, bright green above, covered with a close white felt beneath. The dullish white flowers are in clusters 3 inches wide. Fruit oval, $\frac{1}{3}$ to $\frac{1}{2}$ inch long, scarlet. A handsome British tree worth growing for the beauty of its foliage and fruit. Birds are very fond of the latter. It has several varieties, the best of which is *majestica* with fine leaves up to 6 or 7 inches long; *chrysophylla* has yellow leaves; *salicifolia* has narrow ones.

P. Folgneri.—A Chinese species often very graceful in habit through the arching or even pendulous character of the branches. The narrow leaves are 2 to 4 inches long, white beneath. Fruit red. A tree 20 to 30 feet high.

P. intermedia (syn. *P. scandica*) (Swedish Whitebeam).—This is related to the true whitebeam, but can always be distinguished by the leaves, which are dull grey (not white) beneath, and by the fewer (six to nine pairs of) parallel veins. Fruit oval, red, not so brightly coloured as in *P. Aria*, which is to be preferred in gardens. Found wild in limestone districts in the west of England, Wales, also over N. and Central Europe.

P. latifolia (syn. *P. rotundifolia*).—Another British species, but rare; near Cirencester there is a tree 70 to 80 feet high, with a trunk over 3 feet in diameter, but as a rule it is very much smaller. The ovate leaves are 2 to 4 inches long and the same in width, felted beneath. Fruit dull brownish-red. Interesting as a rare British tree, and one of the largest of the pyruses, but more suitable for woodland or park than the garden. From

being first found in the Forest of Fontainebleau, it has been called the "Service tree of Fontainebleau."

P. Torminalis (Wild Service Tree).—Like the preceding, this is a rare English tree and one of the largest of the pyruses. The rather triangular leaves are 3 to 5 inches long and nearly as wide, shining green above, with no felt beneath. The fruits, which are brownish-red, have been eaten in past times in the "bletted" or semi-decayed state, but only when food was scarce. In S.E. England they are known as "chequers." A very interesting native tree.

P. vestita (Himalayan Whitebeam).—In foliage this is the most striking of all the whitebeams, the leaves being 5 to 8 inches long, 3 to 4 inches wide, dark green above, covered with a thick white (ultimately grey) felt beneath, the parallel ribs in ten to seventeen pairs. It has, however, rarely been a permanent success in this country.

Mountain Ashes.

This group is well distinguished from all the others that make up the genus *Pyrus* by the pinnate leaves. In the arrangement of the flower clusters and in the fruits they are very similar to the whitebeams. In beauty of foliage this group is pre-eminent, the much-divided leaves giving the trees a characteristic grace that none of the others possesses.

P. americana (American Mountain Ash).—A small tree of rather stiff habit, with leaves 6 to 12 inches long, made up of eleven to seventeen narrowly oblong, toothed leaflets, each 2 or 3 inches long. The small flowers are dull white. The fruits, of which fine crops are borne, are in large, very handsome clusters, and bright red. It grows much more slowly than our native *P. Aucuparia*, and is easily distinguished from it in winter by its gummy buds. Eastern N. America.

P. Aucuparia (Mountain Ash, Rowan).—This handsome, well-known tree, usually 30 to 40 feet high, is common in many parts of Britain, especially in the North; in leaf, flower, and fruit it is one of the most beautiful of our native trees.

The ordinary form is quite a charming tree for gardens, but perhaps one or more of the following varieties may be preferred. Var. *asplenifolia* has the leaflets deeply and doubly toothed, giving them a fern-like grace; in var. *integerrima*, on the other hand, they have no teeth at all, or very few. Var. *fructu-luteo* has, instead of the ordinary scarlet fruits, orange-yellow ones, very handsome. Var. *moravica*, the Moravian mountain ash, has the largest fruits of any; they are eaten in Moravia.

P. Sorbus (Service Tree).—Alone amongst this group the service tree has but little beauty in its fruit. They are much larger than in the mountain ash, being 1 inch or more long, and either apple-shaped or pear-shaped, brown tinged with red, few in a cluster. In the rich profusion of its graceful pinnate leaves it is more handsome than most. It grows slowly, but is very long-lived, and will ultimately get to be 60 or 70 feet high. S. and E. Europe.

P. Vilmorinii.—A dainty small tree with leaves only 3 to 5 inches long, but made up of fifteen to nearly thirty leaflets, each $\frac{1}{3}$ to $\frac{3}{4}$ inch long. Flowers white, fruit rosy red, sometimes white. China.

Related to *Vilmorinii* is *P. munda subarachnoidea*, an equally charming small tree, also from China.

Several natural hybrids between the whitebeam and mountain ash are in cultivation. One of the best is *P. pinnatifida*, wild on the Isle of Arran; others are *decurrens*, *Meinichii*, and *neuillyensis*. All these are intermediate between the parents, the lower part of the leaf only being pinnate or deeply lobed; they are downy beneath; fruit red.

Quercus (Oak).

A garden which already has standing in it a few fine English oaks, or even only one, has a very valuable asset. With its associations, its rugged beauty of trunk and limb, its suggestion of strength and long life, no tree has a more enduring charm. Yet so many years does it take to acquire these characteristics

that a more than ordinarily altruistic temperament is required to induce a private person to plant it, especially in these days when the association of places with families is not so fixed as it used to be. There are, nevertheless, other oaks which grow more quickly and have more attractiveness in a small state. One might indeed divide the oaks into those suited for park and woodland and those that may be brought into the garden proper. It is hardly necessary to mention that they have little or no beauty of flower. The oaks are all alike in their love of a rich deep loam, and the sooner they are given a permanent place the better.

Evergreen Oaks.

In "Shrubs for Amateurs" I have mentioned several evergreen oaks from Japan which, although naturally trees, rarely get beyond the shrubby state in this country, except perhaps in the warm south-western counties. Of these *Q. acuta*, *cuspidata*, and *glabra* are the handsomest, all with large, rather laurel-like, shining green leaves. Another with smaller but equally lustrous leaves is *Q. phillyreoides*, which can in a few years, by pruning off the lower branches, be made to assume the form of a small tree of pleasing character. The evergreen oaks of America are of little value, except one called *densiflora*, too rare, however, to be generally obtainable.

Q. coccifera (Kermes Oak).—A small tree, very often a shrub, native of the Mediterranean region from Spain as far east as Palestine. It is quite hardy, but grows so slowly that no tree in this country, even the oldest, is more than 20 feet high; the habit is dense and very leafy. The leaves are roundish, $\frac{1}{2}$ to $1\frac{1}{2}$ inches long, of stiff, hard texture, edged with several spiny teeth. The famous oak of Mamre, growing on the spot where, according to tradition, Abraham pitched his tent, is a form of this oak. It is also of interest as the oak on which the kermes insect feeds. This insect produces the beautiful scarlet dye known as "grain," so highly esteemed in earlier times that the Dyers' Company of London adopted three twigs of this oak as their crest early in the fifteenth century. Its neat growth,

distinct appearance, and more than ordinary interest make it well worth the small amount of space it needs.

Q. Ilex (Holm Oak).—Finest of all evergreen oaks, this is also, apart from conifers, the largest of all evergreen hardy trees. It will grow 70 to 80 feet high and almost as much in diameter, its trunk large, its foliage so copious that the branches form heavy, dark drooping masses, very impressive on old trees. Young ones are more formal in habit. It grows fairly quickly in good soil and is an admirable shelter tree, making also a first-rate background for early flowering trees like almonds, peaches, and cherries. It bears the sea winds well—at any rate on the South Coast. The leaves are very variable in size and shape, but on adult trees are 2 to 3 inches long, $\frac{1}{2}$ to 1 inch broad, black-green above, grey with down beneath. On quite young plants they are smooth and green beneath, with prickly teeth on the margin. As a garden tree it has the defect of shedding the old leaves in May and June, making an unsightly litter for a few weeks. This may be obviated by planting ivy beneath it. Native of S. Europe. It should be transplanted in late May.

Q. Lucombeana (Lucombe Oak). — A hybrid between Turkey oak and cork oak, raised at Exeter about 1765, and a quick-growing, handsome tree, the bark somewhat corky, the oval leaves 3 to 5 inches long, with large triangular teeth, grey beneath. It usually loses most of its leaves in spring, especially after a hard winter, but a seedling form of it, known as var. *crispa*, is quite evergreen and has a more corky bark. This is preferable for small gardens. Specimens of ordinary Lucombe oak are 100 feet high in Devon and Cornwall.

Q. Suber (Cork Oak).—This may be grown for its interest as being the tree whose bark produces the cork of everyday use. It is more suitable for the milder counties (although perfectly hardy at Kew), and as a rule is not so good-looking a tree as the others here mentioned. Portugal is the chief centre of the cork industry.

Deciduous Oaks.

O. castanæfolia (Chestnut-leaved Oak).—A fine tree from the Caucasus, Persia, and N. Africa. Leaves oblong, 5 to 7 inches long, 2 to 3 inches wide, each with ten to twelve pairs of parallel veins and large teeth that make them very like those of the Spanish chestnut.

Q. Cerris (Turkey Oak).—One of the quicker growing oaks; of undistinguished appearance in youth, but of noble port and dimensions when old. Leaves 3 to 5 inches long, 1½ to 3 inches wide, harsh to the touch, greyish beneath. S. Europe, Asia Minor. Var. *laciniata* is a distinct form with deeply cut leaves; var. *variegata*, leaves bordered with white, is one of the best variegated large trees.

Q. coccinea (Scarlet Oak).—The finest for autumn colour of all the oaks, the leaves turning a glorious red. They are shining green on both surfaces in summer, 3 to 6 inches long, 2 to 4 inches wide, with three or four deep lobes on each margin. N. America.

Q. conferta (Hungarian Oak).—A large, handsome tree related to the sessile flowered British oak, but with much larger leaves, up to 6 or 8 inches long, half as much wide, with six to ten deep lobes at each side. One of the best large-leaved oaks. S.E. Europe.

Q. dentata (Daimyo Oak).—Although it does not, as a rule, succeed very well and is often short-lived, this oak is sometimes grown for the unusual dimensions of its leaves, which are occasionally over 1 foot long and 6 to 7 inches wide. Japan.

Q. Libani (Lebanon Oak).—A distinct and elegant small oak with narrow leaves 3 to 5 inches long, marked by nine to twelve pairs of parallel veins, which spring from the mid-rib and terminate in bristle-like teeth on the margin. Syria, Asia Minor.

Q. macranthera.—Very like *Q. conferta* in shape and size of leaf, but whilst, in that species, the under-surface is only slightly downy, in this it is covered with thick soft down. Caucasus, Persia.

THE PENDENT SILVER LIME, TILIA PETIOLARIS

A WEEPING WYCH ELM, ULMUS MONTANA PENDULA.

Q. Mirbeckii.—One of the handsomest of all oaks. Leaves dark shining green, glaucous beneath, sometimes on young trees 7 or 8 inches long, smaller on old ones. They remain fresh and green on the tree until New Year time; in mild winters until February. A good grower, and making a pleasing tree in twenty to thirty years. Certainly one of the most desirable of all oaks for gardens. Portugal and Algeria.

Q. palustris (Pin Oak).—One of the American red oaks, and a large tree of graceful habit. Leaves deeply five or seven-lobed, usually 4 to 5 inches long. From the other two red oaks commonly grown, *rubra* and *coccinea*, this differs by its denser head of more slender branches, also by conspicuous tufts of down beneath the leaf in the angles where the veins join the mid-rib. It often turns a good red in autumn.

Q. pedunculata (Common Oak).—From the other British oak this is distinguished by its stalkless or very shortly stalked leaves, but long-stalked acorns. Many varieties have arisen in cultivation, of which the following are the most notable: Var. *Concordia*, leaves rich yellow, but a poor grower; *fastigiata* (cypress oak), like a Lombardy poplar in growth; *filicifolia* (fern-leaved oak), leaves cut almost to the mid-rib into slender lobes about $\frac{1}{4}$ inch wide, never a large tree; *nigra* (purple oak), leaves deep purple. There are also weeping and variegated forms.

Q. Phellos (Willow Oak).—A large tree with pale green leaves 3 to 5 inches long, but only $\frac{1}{2}$ to 1 inch wide, not toothed. N. America.

Q. rubra (Red Oak).—A large tree with leaves similar in shape to those of *coccinea* and *palustris*, but larger; they differ also in being dull green or even greyish beneath (shining in the other two). The habit is more spreading. A vigorous grower and a handsome tree, but second rate as to autumn colour. N. America.

Q. sessiliflora (Durmast Oak).—This representative of the British oaks is distinguished from *pedunculata* by its stalked leaves but stalkless acorns.

Rhamnus (Buckthorn).

The greater part of the members of this usually unattractive genus are shrubby, but at least two become trees. *R. Frangula*, the alder buckthorn, is found wild in England, usually as a shrub, but occasionally as a tree 15 to 18 feet high. It is deciduous and has oval, glossy green leaves 2 or 3 inches long, with small green flowers followed by black-purple berries ¼ inch wide. Charcoal made from its wood is (or was) used in the manufacture of the best gunpowders. *R. Purshiana* is a tree ultimately 30 feet and upwards in height. The leaves are very like those of *R. Frangula*. It is a native of Western N. America and chiefly of interest as the source of the Cascara Sagrada drug. Both are cheerful-looking small trees.

Rhus (Sumach).

Most of the sumachs are shrubs, but there are three species grown in gardens, all Chinese, that make trees. The finest of them undoubtedly is *R. vernicifera*, the lacquer tree, which is one of the noblest hardy trees with pinnate leaves, and reaches 60 feet in height in China. These leaves are 1 to 2 feet long, made up of seven to thirteen leaflets, each 4 to 7 inches long. In good loamy soil this tree grows quickly; a tree at Kew raised from seed sent from China little more than twenty years ago is already about 40 feet high.

R. Henryi is a smaller tree 20 to 30 feet high. It has pinnate leaves 12 to 15 inches long, with seven to eleven leaflets, each 2½ to 5 inches long. It is of more rounded, bushy habit than *vernicifera*. The third species, *R. Osbeckii*, is a short-trunked, round-headed tree 15 to 20 feet high, the leaves 10 to 15 inches long, with seven to thirteen leaflets, each 3 to 4 inches long. Between each pair of leaflets is a thin, flattened extension of the main stalk, which distinguishes this species from both the preceding ones. All three are deciduous, but *Osbeckii* is the only one, so far as I have seen, that acquires the fine autumnal tints so common to the shrubby species.

Robinia (False Acacia).

Very ornamental trees belonging to the pea family, deciduous, and with pinnate leaves. They are very hardy and succeed well in this country in any well-drained soil, even in that of moderate quality. All of them have rather brittle branches and are not adapted for very exposed windy places. All are natives of N. America and all flower in June.

R. hispida (Rose Acacia).—Strictly speaking a shrub, this is usually made into a small tree by grafting on standards of *R. Pseudacacia*. The wild type has bristly young shoots and leaves 6 to 10 inches long, composed of seven to seventeen leaflets. Flowers of pea blossom shape, in racemes 2 or 3 inches long, each flower about $1\frac{1}{4}$ inches wide and coloured a charming deep rose. The best form of this is var. *macrophylla* (syn. *inermis*), which has no bristles on the shoots, rounder, larger leaflets, and larger, more richly coloured flowers. A very delightful small tree which no garden should be without, but it needs shelter from strong winds.

R. Kelseyi (Kelsey's Acacia).—A very pretty small tree with flowers of a charming bright rose colour, related to *hispida*, but taller and more slender, and with smaller, narrower leaflets. The bristly seed pods are red and quite handsome. A sheltered spot is as desirable for this as for *hispida*.

R. neo-mexicana (New Mexican Acacia).—A tree of small or medium size, with leaves of the same character as the common false acacia; they are 6 to 12 inches long, the leaflets numbering fifteen to twenty-five, each 1 to $1\frac{1}{2}$ inches long. Flowers in short racemes, pale rose, 1 inch wide. This is the only "acacia" found wild on the western side of N. America. It differs from the following species in having bristly seed pods, and is preferable for small gardens.

R. Pseudacacia (False Acacia, Locust).—By far the commonest of the "acacias" (it is naturalized in several parts of Europe), this is also the finest as a tree. It attains 70 to 80 feet in height, and has in age a stout, rugged trunk. A healthy, shapely specimen, well furnished with the beautiful foliage, and

laden in June with abundant clusters of fragrant white blossom, is undoubtedly one of the most attractive of all garden trees. In my experience it succeeds better in light sandy soil than in a rich loamy one; it does not grow so rampantly and is less liable to be damaged by gales. It should be kept to a single leader when young, to prevent the forking of the trunk. Young vigorous trees and sucker growths (which frequently spring from the roots) are thorny. A great many varieties of it have been raised, most distinct of which are the following: *Aurea*, leaves rich yellow in early summer, becoming green later; *bella rosea*, a small, elegant tree with small leaves and rose-coloured flowers; *Decaisneana*, a vigorous tree, flowers rose-coloured; *inermis*, a mop-headed form common in suburban gardens, which rarely flowers; *fastigiata*, like a Lombardy poplar in shape; *monophylla*, a curious freak in which the leaflets are often reduced to one of very large size, or sometimes to two or three.

R. viscosa (Clammy Locust).—A tree 30 to 40 feet high, distinguished by the viscid young shoots. It is richly leafy, and the pale rosy flowers are frequently very abundantly borne. Rare in a wild state, and not common in cultivation.

Salix (Willow).

For growing in such places as by the side of a pool or stream, or where the ground is too damp for trees in general, there is no group from which more elegant and beautiful examples can be selected than the willows. They can be obtained either as young trees or grown on from "setts." A sett is a piece of branch which may be as thick as a broom-handle and 6 or 8 feet long, or thinner and shorter. This must be planted about one-third of its length in the ground and rammed firmly. Cuttings of twigs 1 foot long may also be rooted. Both "setts" and cuttings should be put in the ground between November and February, the "setts" in the place where the tree is to grow. No cuttings take root more readily than those of willows. Whilst with nearly all trees it is a grave mistake to plant trees so deeply that part of the trunk is buried, this is rather advan-

tageous than otherwise in the case of young willow trees such as are sent out from nurseries. The presence of water is not necessary for these trees; they thrive very well in a deep, rather clayey loam. The flowers are borne in catkins, and the trees are unisexual. All are deciduous.

S. alba (White Willow).—A very elegant tree up to 70 or 80 feet high, the smaller branches and branchlets pendulous. Leaves 2 to 3 inches long, about $\frac{1}{2}$ inch wide, grey above, covered with silvery down beneath. Britain. A very silvery variety, *argentea*, is one of the most beautiful of its colour.

S. babylonica (Weeping Willow).—This beautiful tree is a native of China; the "willow by the waters of Babylon," associated by the Psalmist with the captivity of the Jews, was not this tree, but a kind of poplar. So well distinguished is it by the long, slender branchlets, which hang perpendicularly, that it is one of the best-known of all trees. Except when very young, the leaves, which are of about the same size as those of *alba*, and blue-grey beneath, are quite smooth. This tree adds much to the beauty of the middle reaches of the Thames. A famous tree grew above the grave of Napoleon in St. Helena, many descendants of which are growing in England.

S. Caprea (Goat Willow).—A common British willow, sometimes a small tree, often a shrub, the oval to roundish leaves 2 to 4 inches long. It is one of the willows whose flower catkins are associated with Palm Sunday. Not worth a place in gardens.

S. cærulea (Blue or Cricket Bat Willow).—A hybrid between *alba* and *fragilis*, only native of the eastern counties of England. Its timber is unequalled for making the best cricket bats. It is a female tree very similar to *S. alba*, but with an erect habit and with leaves that become smooth as they get old.

S. daphnoides (Violet Willow).—A tree up to 40 feet high, distinguished by the young shoots being covered with a plum-coloured waxy "bloom." It is only worth growing by the waterside and pruned back hard in early spring to produce long shoots for winter effect. Europe, N. Asia.

S. fragilis (Crack Willow).—This large tree, perhaps the largest of British willows and of open habit, gets its popular

name from the curious way in which the twigs snap off in their entirety. The leaves, which soon become smooth, are up to 6 or 7 inches long and ½ to 1 inch wide. It produces a reddish timber useful for cart bottoms, etc. Unsuited for the garden.

S. pentandra (Bay Willow).—A handsome small tree with large yellowish winter buds. Leaves of a dark lustrous green, pointed, 2 to 4 inches long, half as much wide, distinct in their having none of the grey colouring so common in the willows. Britain.

S. Salamonii.—A hybrid between *alba* and *babylonica*, and intermediate between them in habit and leaf characters. Whilst not so weeping as the latter, it is exceedingly graceful. It is hardier than *babylonica* and takes its place in countries where the winters are more severe than ours.

S. Smithiana.—Grown chiefly for the great crops of catkins borne by the male tree in March and April, when it is really attractive. Britain.

S. vitellina (Golden Osier).—A tree 60 feet and upwards high, notable for the bright yellow of its twigs in winter. For their sake it is often grown by the waterside and pruned hard back every spring to produce a crowd of long slender wands. Var. *britzensis*, with bright red bark, may be treated in the same way. For growing naturally as a tree, var. *pendula* is by far the best; it equals *babylonica* in the grace of its long, slender, perfectly pendulous branchlets, which are as yellow as in the type. Very beautiful by the water's edge. The golden osier is of unknown origin.

Sassafras officinale (Sassafras).

For those who like trees with scented foliage this will be a favourite. The leaves and young bark have a charming aromatic fragrance. It has no great beauty in regard to its flowers, these being small and greenish-yellow. The leaves are very variable in shape, often conspicuously two or three-lobed, and they vary from 3 to 7 inches in length, rich glossy green. It was introduced nearly 200 years ago, but is still a rare tree,

being difficult to establish, although quite hardy. It should be planted in its permanent place early, and kept in a pot until that is done. I know only two large trees—one at Claremont, near Esher, and the other in a garden at Wimbledon; these are about 50 feet high.

Sophora.

The sophoras belong to the pea family and have pinnate leaves. In most parts of Britain *S. japonica* makes a very handsome large tree rather like a false acacia (*Robinia*) in general appearance, but never has any thorns. Each leaf has nine to fifteen oval leaflets 1 to 2 inches long, rich green. Flowers creamy-white, in panicles 6 to 9 inches long, opening in September. It only flowers freely after hot summers, but apart from the blossoms this is a charming tree. Native of China. There is a "weeping" variety—*pendula*.

In the milder counties a New Zealand species, *S. tetraptera*, is quite common. It is very distinct from the preceding in the much larger, somewhat tubular-shaped golden-yellow flowers, 1 to 2 inches long, four to eight of them in a cluster. The leaves, although always pinnate, are very variable, the leaflets on each leaf ranging from less than a dozen on young plants to as many as eighty in old ones, they also vary in length from $\frac{1}{8}$ to $\frac{3}{4}$ inch. Scarcely hardy near London.

Syringa (Lilac).

The common type of lilac is dealt with in "Shrubs for Amateurs," as they are usually more shrubby than tree-like. There are, however, two kinds belonging to a distinct section of the genus, named *Ligustrina*, which, in favourable situations, are small trees. *S. japonica* will grow 30 feet high; it has pyramidal panicles of white flowers 8 to 10 inches long, 5 or 6 inches wide, not fragrant. The other is *S. pekinensis*, a Chinese tree 20 feet or more high; in this the panicle is looser and not pyramidal as in the other; its variety *pendula* is even

more graceful than the type. These two species differ from the true lilacs in having the stamens thrust out beyond the corolla; in the true lilacs they are enclosed. Both flower about the end of June, but are rather liable to be injured by spring frosts, and they succeed better where the winters are longer and colder than ours.

Tilia (Lime or Linden).

The limes are deciduous trees confined to the North Temperate Zone, and are most abundant in Europe, Eastern N. America, China, and Japan. Most of them are very handsome trees, some being of large, others of only medium size. Botanically their most distinctive features are (1) the dry, nut-like fruit about the size of a pea, containing one seed, and (2) the large, curious, membranous bract, 2 to 6 inches long, to which the lower portion of the main flower stalk is organically united, causing the flower cluster to appear as if springing directly from the centre of the bract. The limes like a good loamy soil. They flower from June to August, and some of them are charmingly fragrant then.

T. cordata (Small-leaved Lime).—A tree up to 80 or 90 feet high in Germany and elsewhere on the Continent, but usually a small one in this country, where it is a native. Leaves 2 to 3 inches long and wide, smooth above, rather glaucous beneath, with tufts of down in the angles where the chief veins join the mid-rib. A shapely tree. It has also been called *T. ulmifolia* and *T. parvifolia*.

T. euchlora.—One of the handsomest of limes, this has been strangely neglected in this country. It is not a large tree and, on account of its rather pendulous branches, is very graceful. The leaves are rich bright green and smooth, except for tufts of down in the vein angles beneath, 3 to 5 inches long. A very pleasant lawn tree. Origin doubtful.

T. Oliveri.—One of the newer Chinese limes, resembling *petiolaris* and *tomentosa* in the silvery-white under-surface of the leaves. A promising small tree. It differs from the two others just mentioned in having smooth, not downy, shoots.

T. petiolaris (Pendent Silver Lime).—This beautiful tree is distinct from all other limes in the combination of a weeping habit with a silvery under-surface of the leaves. As a lawn tree it is the most effective of all limes. It grows 60 to 80 feet high. The leaves are of the typical lime tree shape, 2 to 4½ inches long, rich green above, distinguished by their long stalks, or petioles, as is implied by the specific name. It flowers in July and August and is very fragrant then. The blossom is more or less poisonous to bees.

T. platyphyllos (Broad-leaved Lime).—A very fine tree, 100 feet or more high, closely related to *cordata* and *vulgaris*, but distinguished easily from both by its larger leaves being downy above and covered with soft down beneath. It also flowers the earliest of the three. Europe (not British). Var. *asplenifolia*, the fern-leaved lime, is remarkably different from the type. The leaves are deeply and very irregularly lobed, and it is a much smaller tree.

T. tomentosa (White Lime).—A large, wide tree of formal, broadly pyramidal outline, the main branches growing rather erect. It resembles *petiolaris* and *Oliveri* in the silvery under-surface of the leaves, but these, in *tomentosa*, have very short stalks, rarely more than 1½ inches long. It has already reached 100 feet in height in the south of England. S.E. Europe.

T. vulgaris (syn. *T. intermedia*) (Common Lime).—This tree is believed to be a hybrid between *cordata* and *platyphyllos*, but when and where it originated is not known. There are two distinct forms of it which do not differ appreciably in leaf, but are easily distinguished by their trunks, one being clean and free from burrs, the other rugged and burred and very prone to develop thickets of sucker growths which will in time completely hide considerable parts of the trunk. The former is the much superior tree. Both here and on the Continent *T. vulgaris* has been much used for avenues, for which purpose it is admirably adapted; in France it has often been planted to make pleached walks. I do not consider it so good a tree for gardens, small ones especially, as *euchlora* or *petiolaris*, because in hot dry summers it is often a dirty tree through being infested with green fly, whose excrement turns black on the leaves and

falls on the ground beneath. Often, too, in such seasons it drops its leaves early. Still, for rural places with a good soil it makes a beautiful and stately tree, occasionally 100 to 130 feet high, with a charming fragrance when in bloom.

Trachycarpus Fortunei (Chusan Palm).

Better known as *Chamærops Fortunei* than by this name, this palm is of particular interest as the only one hardy in our average climate. The crown of broad, fan-shaped leaves, each $2\frac{1}{2}$ to 4 feet wide, with long prickly stalks, surmounting an erect trunk clothed with coarse fibres, provides a garden feature of unique appearance in the open air. Although quite hardy near London, it should have a sheltered position, for it suffers far more from harsh winds than from even a very low temperature. It likes a rich loamy soil, and is benefited by occasional top dressings of manure. Of slow growth and never taking up much room, it is suitable for small gardens. The inflorescence is a large drooping panicle, 2 feet long, of small yellow flowers. Introduced from Japan in 1830.

Ulmus (Elm).

Deciduous trees usually of large size, but occasionally small or medium. The leaves are always toothed and generally unequal-sided at the base. The flowers are small and very numerous, but have no beauty, although those of *U. campestris* will give a reddish tinge to the tree early in the year. The most distinctive feature of the elms is the fruit, a thin, roundish or oval, semi-transparent, hop-like disc, $\frac{1}{2}$ to 1 inch wide, enclosing a single seed in the centre or near the apex, which is always notched. These trees enjoy a good, deep, moist soil, where they are much less subject to the attacks of their worst enemy, the elm beetle, an insect which bores through, and deposits its eggs beneath, the bark, often killing the tree.

U. campestris (English Elm).—This noble tree is wild only

in the South of England, where it is common in hedgerows. At its finest it is 120 to 130 feet high, with a trunk 15 to 20 feet round. Owing to its voracious nature and far-spreading, sucker-producing roots, it is a quite unsuitable associate for shrubs and small trees. It is a fine avenue tree, as witness the Long Walk at Windsor, but in old age is dangerous through its propensity to shed large limbs without warning. For both these reasons it should be kept out of the garden. It is an infertile tree, and is propagated from the sucker growths its roots produce so freely. A variety called "Louis Van Houtte," with yellow leaves, and one with white variegated leaves (*variegata*) are amongst the best trees of their respective colours.

U. major (Dutch Elm).—A British elm thought to be a hybrid between *montana* and *nitens*. It equals in bulk the common elm, but has a much more open, spreading habit. The leaves are larger and up to 5 inches long, with ten to fourteen pairs of veins; they are downy only in the vein-axils and along the mid-rib beneath.

U. montana (Wych or Scotch Elm).—This fine tree, equal in size to the two preceding, is also native of Britain, most common in the North. It has an open, more spreading habit than *campestris*, from which it differs in the larger, very downy leaves 6 or 7 inches long, half as wide; in the very short leaf-stalks, and in not producing suckers from the roots. On account of this last character (which in *campestris*, *nitens*, and *major* is apt to be a nuisance), *U. montana* is commonly used as stock for grafting the other elms on. A weeping variety of it, *pendula*, is a popular lawn tree, forming, as it does, a natural arbour.

U. nitens (Smooth-leaved Elm).—Common in the eastern counties of England, this also makes a fine tree, pyramidal in a young state, becoming pendulous branched with age. The upper surface of the leaf is quite smooth to the touch, thus providing a ready distinction from *campestris* and *montana*, in which it is rough. The veins of the leaf are in ten to thirteen pairs. *U. nitens* is a charming tree, more graceful than any of the preceding. There are pendulous and variegated varieties.

U. parvifolia.—One of the smallest of elms, and not more

than 30 to 40 feet high. Leaves 1 to 2 inches long, half as wide, smooth and glossy green. A very elegant tree which often retains its foliage fresh and green until well into December. China.

U. stricta (Cornish Elm).—A tall, slender tree native of the south-west of England and Brittany. The columnar shape of this elm, due to the shortness of its side branches, makes it very distinct. Its leaves are smooth to the touch, glossy green, only 2 or 3 inches long, with tufts of down in the vein-axils beneath. Var. *Wheatleyi*, the Guernsey or Jersey elm, is of similar habit, but the side branches are more erect, and the tree more pyramidal. A very useful street tree, much planted at Eastbourne.

U. vegeta (Huntingdon Elm).—A hybrid between *montana* and *nitens*, raised at Huntingdon in 1836. It is a huge tree with usually a short, very thick trunk, and exceptionally vigorous in growth. In several respects it is intermediate between its parents, the leaves being smooth above and only downy beneath in the axils of the veins, as in *nitens;* they are, however, 5 or 6 inches long, and thus approach those of *montana* in size. The veins, too, are in fourteen to eighteen pairs. A fine park tree.

U. viminalis.—A very elegant, slender, small-leaved elm of unrecorded origin, but no doubt produced under cultivation and not a wild species. The branches are pendulous, very leafy, the leaves only 1 to 2 inches long. For small gardens this is the best of all elms, and it is rarely more than 30 feet high.

Zelkova.

This is a small genus of trees of which five species only are in cultivation. They are closely related to the elms. In 1760, *Z. crenata* was introduced from the Caucasus, but is still comparatively rare. It has a smooth grey trunk like a beech, and its branches are erect and crowded, forming a tall oval head of branches. The leaves are oval, 2 to 3 inches long, and conspicuously toothed. A distinct and picturesque tree undeservedly

neglected. There is a good example just inside the main entrance to Kew Gardens, about 60 feet high, planted soon after the species was introduced.

Z. acuminata is a Japanese tree of more spreading habit, the leaves half as long again as those of *crenata*, more slenderly pointed and more sharply toothed.

INDEX

INDEX

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